

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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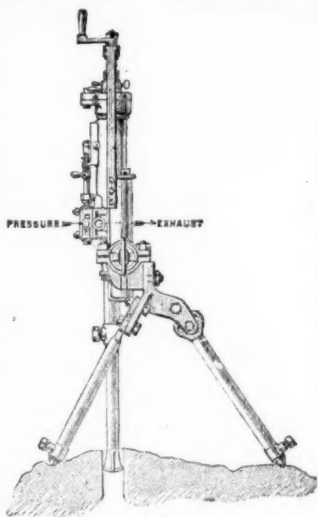
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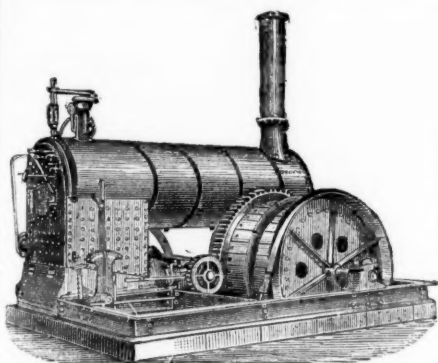
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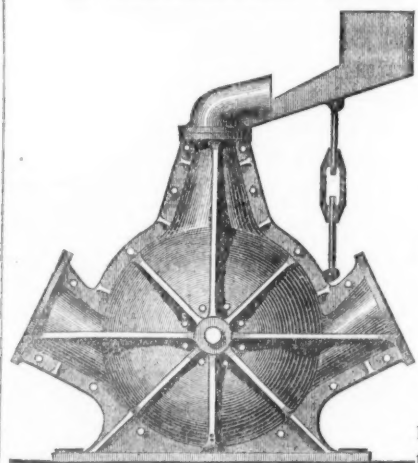
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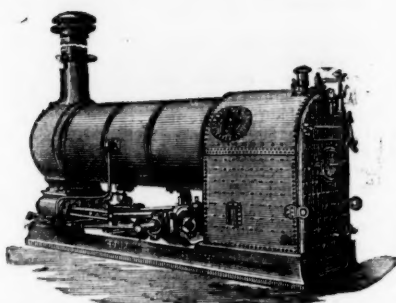
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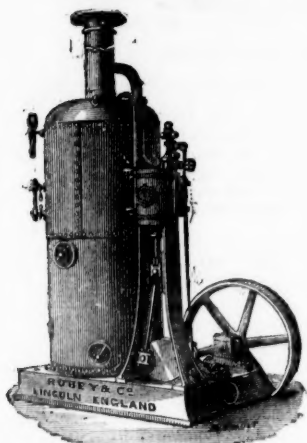
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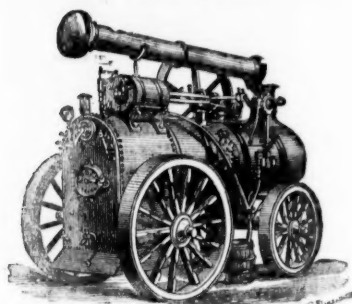
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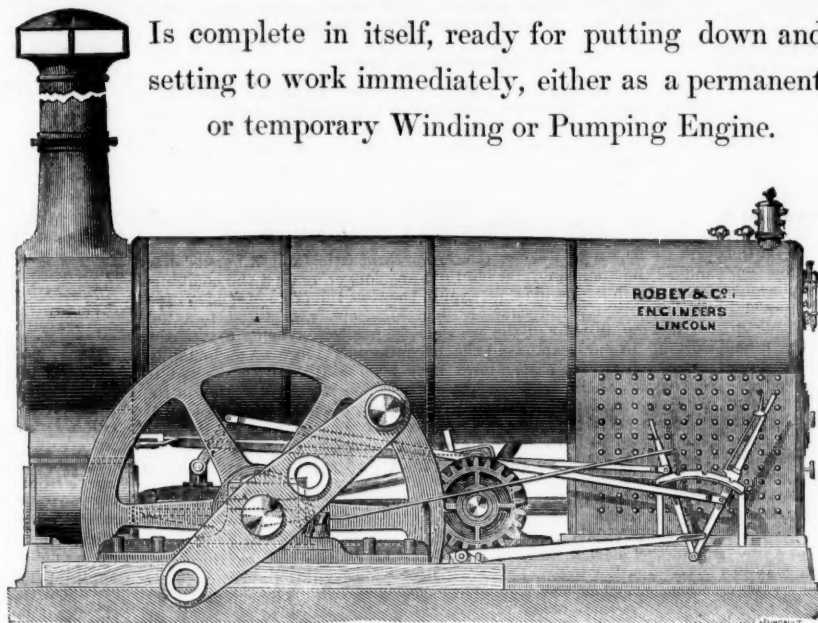
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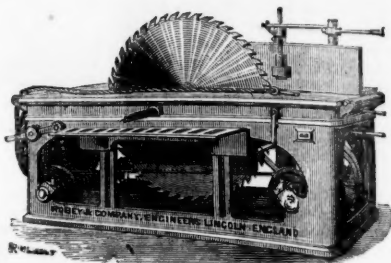
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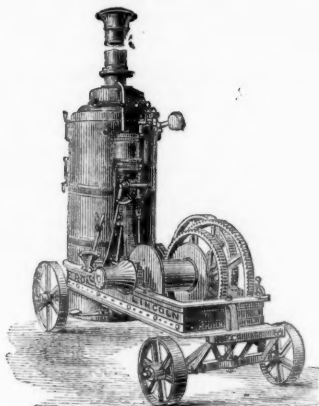
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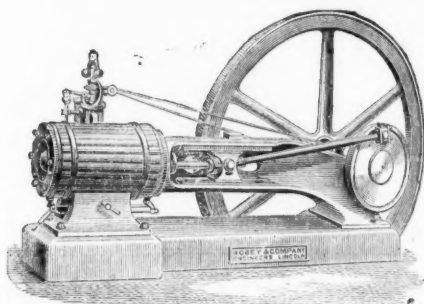
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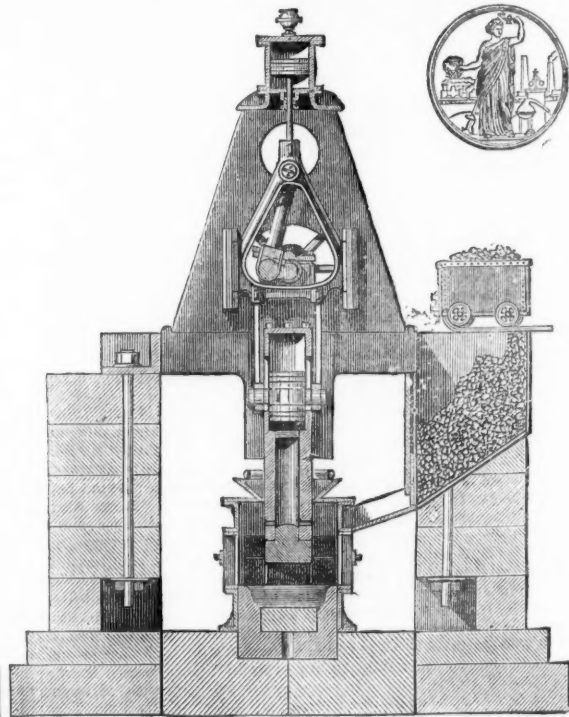
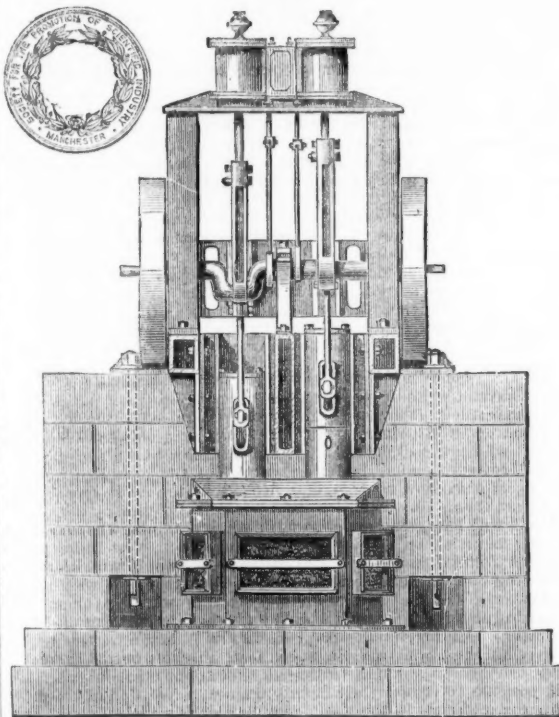
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THE PREVENTION OF COLLIERY EXPLOSIONS.

SIR,—From what has before been advanced it will be seen that the cause of colliery explosions has in many instances been ascertained with some degree of accuracy, in other cases the origination of the accident has been mere conjecture, though from the unskilful practice pursued in such mines a pretty correct idea may be formed as to the way in which the accident has occurred. The result of following and persisting in practices attended with so much risk is sure sooner or later to end in disaster, the most common defects in mine management being the allowing accumulations of fire-damp to stand, the use of naked lights in gaseous mines, shot firing in such mines, and insecure lamps. The most complete investigation is nowadays made into the cause of every colliery explosion and the condition of the mine at the time of the occurrence. The assistance of the most skilful and experienced mining engineers of the day should be brought in to throw all the light which experience can suggest on the subject of investigation, comprehending the cause of explosion, and the giving recommendations for preventing accidents, and the future working of the colliery. It is satisfactory to know that the result of adopting such recommendations has been always a change for the better in freedom from accidents. Unfortunately the remedy in these cases is too late in being applied. It is only after a warning in the form of an explosion and loss of life has occurred that such remedial measures have been adopted, and the mine worked on secure principles, and somewhat in accordance with the most approved practice of the day.

The late explosion at Risca Colliery is an instance of the difficulty there is in some cases of finding out the cause of an explosion and the variance of opinion amongst engineers brought in to investigate the matter. It will be remembered that the explosion occurred during the night or repairing shift, when 120 men were employed in the mine, all of whom perished, and that the firing of shots was allowed only during this shift—not in the day shifts. It does not appear, however, that a shot had been fired at all during this shift on the night of July 14, so that we may in this instance dismiss from our minds as out of the question this prolific cause of colliery explosions. Mr. Dickinson attributed the presence of gas to the cessation or decrease in speed of the fan, or to doors being left open. Either of these are possible causes of accumulation of gas, but as has been before pointed out, the use of doors depending on the attention of boys is highly improper, and self-acting canvas doors should be substituted for them. If ordinary attention had been given to the fan the cessation or decrease in speed could not have occurred, but the suggestion that registering apparatus should be affixed to it is a good one. All the other witnesses attributed the presence of gas to a sudden outburst. In either case the question arises how the gas was ignited where safety-lamps were in use. The Clanny lamp (used in this mine) was condemned by several witnesses, though preferred to others by one. It is clear that if the lamp had been of the self-extinguishing kind, as adopted in the Yorkshire district, an explosion in all probability would have been averted. However, as most insecure lamps are still permitted to be used in fiery mines, the time we trust has come when only such lamps as will pass the ordeal of searching trials will be allowed to be used, and these constructed only by approved and certificated makers.

Mr. Dickinson pointed out the great advantage of working coal as adopted in the Lancashire district, by driving first to the boundary in strait work, and then working back to the pits the great bulk of the coal. He recommends the system for adoption in South Wales. However, no other witness seemed to give this suggestion his approval. One witness thinking the pillar and stall system the best adapted for the Risca district, but most of the others recommended the longwall system in preference even to the double stalls. The verdict of the jury at the inquest was to the effect that an explosion of gas caused the loss of life, but the cause of the explosion had not been shown by the evidence.

A comparative statement of the loss of life in 1879 from explosions of fire-damp, as furnished by the Inspectors of Mines, shows the loss of life to be in South Wales 70; Scotland, eastern district, 32; Yorkshire, 31; East Lancashire, 10; North Staffordshire, &c., 10; South Staffordshire, 10; Monmouth, Somersetshire, &c., 9; West Lancashire and the western district of Scotland have each 5; while Derby, &c., has 1, and Durham, Northumberland, and Cumberland (two districts) have only 1. It must not be inferred from this that the mines of the last-named district (Durham, &c.) are free from fire-damp; on the contrary, that is and always has been largely produced in those mines. This fact is proved by the numerous explosions that have happened in former times, now happily prevented by improved systems of ventilating, lighting, and regulating the mines, the supervision of the workings being attended to continuously by careful and experienced overmen and deputies. The favourable conditions, as to slight inclination of the strata, good roof and floor, must, however, be admitted in making any comparison with other districts. The freedom from explosions in the Midland district—Derby, Nottingham, and Leicestershire—may be attributed to the issue of fire-damp being limited. It appears that only one explosion occurred in this district, causing one death. The accident arose from an accumulation of gas taking place in a heading, which was carelessly unventilated; this gas coming in contact with the naked light of the miner caused the explosion. This was a direct violation of the first general rule of the Mines Regulation Act; this rule so often violated in coal mines generally through sheer inattention—as has been proved over and over again—gas has been allowed to accumulate, both in large and small quantities, even without precautionary measures being taken to have it swept away.

In Mr. Hall's district, comprising West Lancashire and North Wales. Five explosions occurred in West Lancashire, whereby three persons were killed and ten injured. It may be said that the mines in this district do not give off gas largely, but only to a moderate extent, and the greatest faults seem to have been a careless use of the lamps; two explosions were caused by using naked lights where lamps were appointed to be used. This indicates a laxity of discipline; besides naked lights were frequently used in the return airways, a very unsafe practice. One explosion was caused by blasting, the shot having ignited gas and injured the firemen who had the moment before fired the shot. With ordinary care in the use of lamps there does not appear to be any difficulty in preventing explosions in these collieries.

In North Wales eight explosions occurred, resulting in the loss of two lives and injuries to 13 persons. The cause in each case seems to have been the use of naked lights, even in places where lamps were appointed to be used. In some mines where the use of open lights had occasioned explosions lamps had been substituted. This with care will no doubt diminish the number of accidents, more particularly if shot firing is prohibited.

In the South Staffordshire district Mr. Baker reports that fatalities from all causes are now about one-third what they were in the year 1851. The only hope of diminishing the death rate rests on greater carefulness and obedience to orders on the part of workmen, and stricter supervision on the part of those to whom the management of mines is entrusted. Five explosions occurred in this district, resulting in the loss of 10 lives. The most serious of these happened at Short Heath Colliery, resulting in the loss of six lives, the whole of the men in the pit at the time. The cause of this explosion was an accumulation of gas taking place under a scaffold put in at some distance up from the bottom of the pit. This was done in order to commence the working of a seam of coal, headings having been driven in it for five yards in two directions from the top of the scaffold. Six persons were at work at this part, and gas from the lower seam appears to have accumulated under the scaffold, and to have oozed through it and fired at the men's candles. These men came to their death not by burning but by suffocation from after-damp.

Another explosion was caused by the imprudence of a miner. While driving in his place and using a lamp an issue of gas from fissures in the coal took place. This heated the lamp so much that when the man perceived it he became alarmed and snatched it up suddenly. This jerking caused the flame to pass through the gauze and ignite the fire-damp. The man was severely burnt, and died seven days after the occurrence.

Another explosion was caused by a miner going into a certain road with a naked light where gas was lodged in the roof. This he did contrary to the orders of the overman. The fire-damp ignited and burnt him slightly, but the man died three weeks after.

Another explosion happened from a very imprudent method of clearing an air head of gas. This place, driven about six yards, had no brattice or other means to ventilate it, consequently gas accumulated. The worker in this place was told by the fireman to go into it without his candle and brush out the gas with his jacket. This he appears to have done ineffectually, and shortly afterwards went into the place with his candle and fired the gas which still remained. The result was the loss of his life. This was a case of recklessness and indifference to the general rules. These require proper means to be taken to prevent gas accumulating and displayed great ignorance on the part of the miner, first in depending on such a method of clearing his place of gas, and going into it without first trying with a safety lamp how far it was safe to do so.

Referring to these five explosions the conclusion any one conversant with mining would come to is that they were all the result of recklessness and laxity of discipline, in the handling of safety-lamps, in driving places without bratticing them, in going into places contrary to orders, or want of care and foresight, as in the case where a scaffold was inserted in the pit and gas accumulated under it. The whole are clearly preventable accidents, both agents and workmen being censurable for such unworkmanlike proceedings. M. E.

LONDON COAL SUPPLY.

SIR,—Permit me, with reference to your last week's Report from Derbyshire and Yorkshire, to state that I purpose leaving on Wednesday for said colliery districts, when ample opportunities will be afforded to the coalowners to become acquainted with the merits of my undertaking, for which the initiative capital—1,000,000*l.*—is assured.—*Little Tower-street, Aug. 30.* W. J. THOMPSON.

NEW SOUTH WALES—COAL MINING.

SIR,—The temporary strike of our Newcastle Coal Miners is at an end, as the men could not hold out any longer against the combined force of public opinion and capital; and as the price of coal was reduced to 10*s.* per ton, they also had to accept from 3*s.* 6*d.* to 3*s.* 9*d.* for hewing, instead of the previous 5*s.* per ton. Owing to the easy working of our seams, and the exceptionally large wages made by the men for years past, miners have been continually attracted to Newcastle; there are too many of them now regularly settled in the district, with families growing up, to leave fear of any prolonged or disastrous strike in future. As regards the lowering of the price from 14*s.* to 10*s.*, it arose from various causes, the principal one, perhaps, being an "understood" desire among the principal collieries to crush out some, if not all, the smaller and weaker ones which had struggled into existence owing to the enormous profit at 14*s.*, and which a sudden fall to 10*s.* (if only persisted in for six weeks) was sure to accomplish; and although, of course, they could never command the market, still, owing to the very large rebates they were forced to allow to even gain a footing with regular purchasers, they indirectly forced the larger collieries to the same course in a lesser degree, and there is little doubt that as soon as this result is carried out and the "mushrooms" squelched, the price will be raised to about 12*s.*, at which it will give splendid profits to the really good miner (on the Wallsend seams), whilst not being unduly high for the foreign market.

For over five years I purchased, on intercolonial account, about 30,000 tons per annum; and besides the usual high discount got large rebates (in some cases up to 2*s.* 6*d.* per ton) on guaranteeing to take large and regular lots within the 12 months, so that now there is no margin to do this. That wages are lowered and the discount also, there will be margin for steady and handsome profit on such mines as have the known bore-hole or Wallsend seams, and are within the 10 mile radius from Newcastle, as although the Bulli and other southern coal is good for ocean steamers, it is not an "all round" coal for gas and household as well, like the Newcastle Wallsend is, the present quotation being a fair proof of this—i.e., Bulli, 10*s.* shares, quoted 11*l.*, 12*l.*; Waratah (Newcastle), 6*l.* shares, 7½, 7¾; Wallsend, 4*l.* shares, 13*l.*, 14*l.*

Owing, also, to the sudden demand for wheat ships from Adelaide, South Australia, home to England, at least 100,000 tons less coal were taken away by ships bound eastward or to San Francisco, seeking homeward freights; but as such a rush for wheat is not likely to happen again, the old demand is likely to spring up next year as usual, as when homeward freights are low or scarce in all or any of the other colonies, ships come on to Sydney or Newcastle as ports of call, as a matter of course; and although New Zealand even has been trying to use her own coal on her inland railways, she is obliged to use ours for steamers, and also for gas and even household in many of her ports where Newcastle can ship cheaper to than she can coastwise even. Another new opening, too, is the employment now of steamers in the South Sea Island trade, whilst the steady and increasing settlement on all our coastal ports and rivers is also creating a growing demand for coal for all the steamers now replacing the sailing vessels. One thing is very certain—population is growing here, and coal is not, and as the demand for it is continually increasing one of the shareholders in the really first-class Newcastle and southern mines need scarcely feel any fear either for their present, and certainly not for their future success. R. D. ADAMS.

Sydney, New South Wales, June 30.

GOLD MINING ABROAD; AND IN THE DUTCH WEST INDIES.

SIR,—I do not write in the spirit of a pessimist, but I put it to you, as the oldest established and most recognised authority on mining matters, if the time has not arrived when it is essential that the public who are seeking safe investments, now that a revival of trade, &c., is approaching, should be warned of the crowd of gold mining enterprises now floating, and decked in the most enticing garbs before them. My attention has been called to this by one of my clients, who has great experience in foreign mines, who writes respecting an article on Gold Mining in the Dutch West Indies in last week's Journal, as follows:—"I perceive that the Aruba Island Gold Mining Company are again in their old situation—in want of further capital. To the general mining public no warning is necessary, but to the unwary investor I would advise extreme caution in this quarter." Mining, like history, repeats itself; but, nevertheless, it behoves all those who are old subscribers to the Journal to remember the lessons you have recorded, and to be on their guard, and, if possible, to protect their clients against a repetition of those disastrous speculations in the search and manipulation of gold mines in foreign countries. It would be needless and invidious to particularise the numerous cases of the large sums of money that have passed out of this country never to return. In reports on auriferous properties the richness of some special samples are often alluded to as an important test, but it is quite a delusive one. As the late Professor Forbes justly observed, "Gold is not found in remunerative quantities when it contains above one ounce per ton;" and you have frequently recorded flourishing prospectuses in which 200 to 500 ounces per ton are put forth, and those mines are either vanished or not quotable; and even among Welsh mines we hear of splendid specimens. Even in your Share List of this week I find upwards of four millions subscribed capital for gold mining abroad among about 40 companies, out of which only seven are dividend paying, and, with the exception of the old-established St. John del Rey, these dividends are relatively very far below any ordinary railway shares, and are not comparable to some of our home mines, for out of a total only one-sixth are valuable, and then on such slender basis that they cannot come under the denomination of being properties at all.

The glowing reports of the Wynaad district, and the intimation that it was the Ophir of Solomon, may be another bait, but still that is to be proved, and it is quite possible that another similar to the Australian gold field may be found there from the character of the reefs so frequently described in the Journal. However, this field is a more legitimate one for English enterprise, being in our own territory. My correspondent, who has had much experience along the

Venezuelan coasts, has seen the failure of many gold seeking enterprises in that quarter, and among them the Aruba Island, which was tested very carefully by some of the most able gold miners of South America. He considers as I do, that it devolves on a journal of such high standing as your's to divert the flow of capital from such baseless enterprises in foreign countries to more legitimate ones in our own country and colonies where there is such ample room for its employment.

The report on this particular enterprise in the Aruba Island is garnished in the usual style with many of those statements based on a few assays, such as after the crop ore fetching 7262*l.*, the remainder tailings are valued at 10,000*l.*, to obtain which some new process is alluded to. Then for the future returns, the novelty of wind-power is to be used to crush 800 tons of quartz per month, without alluding to any selection of ore from the lode, but presuming that there is a constant percentage throughout the quartz or other matrix. A similar multiplicity of quartz veins observed by Mr. Taylor are visible in the neighbouring islands among the basaltic rocks, but they have not yielded any gold to the various assays they have been subjected except in some rare instances. The staff of Italian miners from Pestarena after their expensive, and to the shareholders unfortunate, education there, may elucidate matters on this island more satisfactorily; but since the company is convinced of having such rich quarries of gold quartz why not subscribe the small amount of capital they appear to want among themselves. The old adage, "It is not all gold that glitters," is very applicable to the present furor for gold mining speculations.

London, Sept. 2.

AN OLD SUBSCRIBER.

THE LEAD TRADE.

SIR,—The market here is very flat, and the following sales are reported: 400 tons rich Spanish, at 16*l.* per ton; 150 tons (50 to 60 ozs. silver) do., 15*l.* 17*s.* 6*d.*; 400 tons rich, 16*l.* per ton. Since these sales there has been a sale of Greek lead by tender, the London buyers taking it at 15*l.* 6*s.*, and the quantity 600 tons. There are only about 240 tons ship and on the way unsold, and the importers expect higher prices and are warehousing the lots as they come to hand, as the shippers in Spain want 17*l.* STOCKS.

Newcastle-on-Tyne, Sept. 2.

MINING IN MONTGOMERYSHIRE.

SIR,—Reference being made in last week's Journal in a short paragraph concerning a discovery of lead ore made at the Cwm Hafod-y-Merch Mine (Anglice, "The Lady's Summer Residence in the Glen"), prompts me to resume my notes on the above, for my last letter concluded with remarks on the mine adjoining Cwm Hafod-y-Merch—the Cafarthia Mine—which place I am informed is improving in a very material sense. Last week I saw some fine rocks of lead brought to surface from some of their deep levels on the Dylife lode. I hope it may continue, as this company are deserving of a good mine. They have a fine field of machinery for all purposes, and a never-failing source of motive power always available from a natural lake called Glaslyn, which I am informed contains no fish, although several attempts have been made by transporting some from a neighbouring lake but with no success. The late Capt. Edward Williams, who for nearly half a century managed the Dylife Mines with so much success, and who undoubtedly was one of the best miners of his day, used to say that if the Cafarthia was developed to a proper depth it would prove one of the best mines in the district, and no one had more experience than he with the different lodes traversing it; he also held a very good opinion of Cwm Hafod-y-Merch, which adjoins Cafarthia, and also of another mine to the north-east called Cwmlychan, which, under his management, produced a large quantity of ore; and knowing as I do every foot of ground developed up to a recent date by the winze in which lead has been found at Cwm Hafod, I have no hesitation in stating that if they only continue it downwards to, say, a depth of 20 fms., and drive along the line of the lode in the winze towards its junction with the other lode, and the distance will not be great, they are sure to meet with a large and lasting body of ore. I have myself taken out of the lode in the winze large lumps of lead, so pure and molten like that I could write my name upon it. The north wall of the lode is almost perpendicular, and in many places as smooth and bright as polished steel. I am always convinced that this is destined to become a great mine.

Having already referred to Cwmlychan, which up to a recent date has, like many others, been lying dormant but is now about receiving the attention it deserves, and the adit level commenced by Captain Williams, late manager of Dylife, some 20 years ago, is now being pushed forwards towards the lodes which have been so prolific in their upper deposits for lead, having yielded a vast quantity of that mineral from shallow adits and winzes and open cuttings into the lode. It appears they have already cut into a branch, or an east and west lode in the end of this deep adit, from which some fine specimens of lead and lode has been taken, the general characteristic of which is congenial for its production in large quantities. The gentleman who commenced this adit felt very sanguine of finding the east and west lodes productive at this depth, and so far as indications and results go his prediction has come to pass, and from this level they will have a proper stand-point to start from, and open out the mine in a miner-like manner as it ought to be, by communicating the shallow workings that had to be abandoned in consequence of water overpowering them, with the main adit, and thereby drain the whole of the water to this point, thus giving them some hundreds of fathom of high and dry ground above the adit on course of lode to develop, and the present holders will reap the benefit of the anxious and costly work of years to former investors. This mine again is favourably situated as regards water for motive power and transit of ore and materials, being within 2½ miles of a railway depot. Looking at this mine in its various aspects it is no doubt a most legitimate venture, and altogether out of the pale of a speculation.—*Aug. 30.* MINER.

WHEAL AGAR—TRANSFER OF THREE SHARES.

SIR,—I regret that your columns should be the medium of circulating untruths. You have been pleased to give this case unusual prominence in last week's Journal. Had the facts been truly stated I should not have troubled you with this communication. You start your article by saying it is another instance of the necessity of prompt registration. I deposited the transfer within a week of my receiving it, and never heard of any obstacle to its registration, and was unaware until December, 1879, that the transfer had not been made at once and duly on presentation. There was no looseness on my part as you state. On Nov. 24 or 25 last I visited Mr. Laws' office, on the eve of my departure for Cornwall to attend the meeting. I then saw my signature to the said transfer, not knowing until I turned up the layer of papers on it what it was. I then saw Opie's signature witnessed by one H. Bennett. The writing of Opie was unmistakable—the whole of the said transfer usually written, save my name and address, being in the same hand and style—while the signature of the witness was small, and in a different hand, and had evidently been much absorbed by blotting-paper quickly applied to it. From the time deposited to Nov. 24 or 25, 1879, I never saw said transfer, nor did a word ever pass between me and Mr. Laws respecting the same until the following month (December) that I found the document was missing, and between which dates Mr. Laws had ceased to have any connection with the mine. I then demanded to know how he had registered the shares, the calls not being paid. His reply was, "I debited you with them." This was the natural consequence of his neglect, but finding his books did not bear out this statement he asserts that I told him Opie was a merchant. What a fool I should be knowing he kept, or should have kept, the merchants' ledger, knowing also that Opie was a clerk whom I saw almost every month.

In your article you say Opie paid all the calls; this is untrue. To this day (Aug. 30) he has not paid a call since the one made on Jan. 7, 1877, there being four calls now owing. The receipt produced, and the only one Opie could produce, was for the call made on that day—receipt dated Sept. 12, 1877.

The transfer is missing—willfully destroyed or kept back I fear; and although it has been suggested by one who had the shares offered to him before I bought them that I should offer a premium to parties who are able to throw some light on the matter, I refused promptly

to do any act to cast suspicion of bribery. Unfortunately, Mr. Bennett could not tax his memory, as he had destroyed most of his books on taking the Clinton Hotel, at Redruth. He said, "I was there when you bought them, but whether I sold them to you or not I cannot tell." Nor did he recollect selling Opie two shares in South Condurow (a dividend mine) at the time.

The Vice-Warden ignored the probability of Opie's having sold his shares at a time when West Basset was 20,000*l.* in debt, as it was shown to be at the June meeting of 1877; when Carn Brea, Tincroft, Dolcoath were heavily involved, and the darkest gloom on Cornish mining pervaded the market, West Basset was sold at 1*s.*, Carn Brea given for the call, Dolcoath down to about 19*l.*, calling mines going a-begging, we are asked to believe in a forgery of three shares. I leave your readers to draw their own conclusions.

Through the grossest carelessness, or wilful revenge, on the part of a late servant of the company I am unable to produce evidence that would place beyond doubt the signature and title to the shares. The Vice-Warden placed some stress on the absence of any witness to the signatures of transferee or transferor, and evidently thought it was my business to bring one from Mexico and hunt London or the seas for another. For what?—to swear to signatures I could not produce, but should only be glad to do so.

I leave it to the impartial readers of the Journal to draw their own conclusions, adding, had it not been for the unscrupulous insinuations and untruths in the plaint under which no honourable man could sit down, your columns might have been appropriated to better purpose.

Aug. 30.

H. WADDINGTON.

TRANSFER OF MINE SHARES.

SIR,—In an article under this heading, which appears in the Journal of last week, and having reference to a trial at Truro, the writer refers to my evidence as being open to difference of opinion, but does not thus also apply to other evidence given at the same time? What I stated was strictly in accordance with facts, however irregular it may have appeared, and the defendant's memory must have failed him sadly when he denied instructing me to make the entries respecting the calls on Mr. Opie's shares. Had the calls been paid in the usual way there would have been no difficulty in the registration of the shares in the first instance. As it was, perhaps, I should have acted wisely to have refused to hold the transfer. I did not know Mr. Opie, neither was I aware of his position. I stated at the time that he did not appear as a creditor, and the defendant's reply was "that we have had something of him." With regard to laxity of management whilst the pursuers was in London there may be some truth in the remark, but I am not responsible, as I simply followed the instructions given me from time to time by one of the committee.

That the missing transfer was in the ledger when I left the book at the mine there cannot be a doubt, and I can produce evidence to prove that it was there when I packed up the books and papers for the meeting, and until they reached their destination the parcel was unopened. That this missing link should have so suddenly disappeared is, to say the least, strange, but the fact that defendant was unable to prove the purchase of plaintiff's shares was evidently sufficient in the mind of the Vice-Warden to justify the adverse verdict to the defendant. It was not my intention to enter into a controversy on this matter, but if need be I may comment more fully on the assertions made with regard to the London management.

Church-court, Sept. 1.

T. B. LAWS.

BREAGE MINING DISTRICT.

SIR,—After the late depression in mining it is cheering to find steps are being taken to restore this once famous tin producing district to its former prosperous state. At Old Great Work active operations are going on under the management of Capt. Teague, of Tincroft, to start the engines and drain the old workings, which will give a large amount of employment, and, it is hoped, good dividends to the owners, as in former days. Adjoining this, West Godolphin has been taken up by an influential party, and will soon be in operation, and of this mine it may be said that scarcely any other, to the same extent of development, produced more tin; and the sett is well spoken of by those best able to judge. To the west of the mines referred to is Molesworth United, a new mine just commenced, and I find by passing that way to-day a valuable lode for tin has been cut in the adit (40 fathoms deep) in driving east, all in new ground. This sett has always been considered about the best in the district, but in the past there has always been difficulties in securing the ground on satisfactory terms; now this is overcome a first-class tin mine is expected will be the result of present operations, and the discoveries now being made seem to warrant it. I hear of two or three other promising mines that are to be worked in the locality, which will be cheering to the miner and profitable to the investors there is little doubt.

CHEAP MINES—WEST CHIVERTON.

SIR,—In the early part of this month I wrote a letter to the Journal recommending, among others, West Chiverton as a mine the shares of which might be looked upon as a very cheap investment. I there pointed out that there was sufficient ore laid open to surface in the shallower levels as would pay for the working of them, and that cross-cutting and driving were being pushed on to points which might turn out as rich as any point already operated upon in the course of a few weeks. In making those remarks I merely assumed them from observations I had made in reading the various reports issued from time to time by Capt. Southey as to the working and indications at the various levels. I was particularly well pleased, therefore, on perusing Capt. Southey's report in last Saturday's Journal to see how probable my anticipations are likely to come true, and I now feel confident that we shall not be long before we hear and see something more from West Chiverton which will reinvest it with some portion at all events of its former glory, and I shall not be at all surprised if we receive a very substantial dividend before or about Christmas. "History repeats itself," and in nothing more than in mining do we find this old saying verified. Going back to the period when West Chiverton was at its zenith the shares were selling at over 80*l.* each; in 1876 they were down to 2*l.*; and again in 1878 they were up to 19*l.* each, and the mine paying substantial dividends. With indications such as Capt. Southey sets out in his report of Aug. 25, I believe we are justified in looking forward to a renewal of that happy prosperity which in former years so signally characterised West Chiverton.

WEST GUNSLAKE (CLITTERS).

SIR,—I notice in last week's Journal that Capt. Rowe reports having cut a very promising lode or two at West Clitters, but has Capt. Rowe or his employers asked the consent of the Gunslake (Clitters) and Hington companies for liberty to enter upon their respective setts to search for lodes? I think before the West Clitters shareholders ordered Capt. Rowe to search for a lode they should have instructed some intelligent man to point out to Captain Rowe the boundaries of their sett, and where to sink the pits. Now, the West Clitters Company will most likely have to pay more in damages to the other companies and the landowners than it would have cost them for the services of an intelligent man.

Tavistock, Sept. 1.

THOMAS JENKINS.

GUNSLAKE (CLITTERS) MINE.

SIR,—Referring to the report of the agents of this mine in last week's Journal, I notice that the two months' copper ore for sampling on Aug. 27 was estimated to be 400 tons, but it turned out to be 430 tons. The average price for the previous two months' ore was 5*l.* 12*s.* 6*d.* per ton, but these 430 tons I hear are expected to realise a much higher average price. Supposing, however, it brought only 5*l.* 15*s.* a ton, it will give 2472*l.* 10*s.*, from which deduct 1472*l.* 10*s.* for the two months' cost, and a profit of 1000*l.* will be left to the shareholders on the two months' working. This is the result of the first two months' solid working of the four new jiggers, and after next week, when the two additional new jiggers are completed, they will be safe to get 600 tons for each two months' sampling, which, at the price named above, will realise 3450*l.*, from which deduct 1750*l.* for each two months' cost, and a clear profit is shown of 1700*l.* for

each two months' ore, or in round numbers 10,000*l.* a-year, or 20 per cent. a share at the present price of 5*l.* each. According to the estimated accumulation of reserves for the last four years, a clear profit of 10,000*l.* a-year can easily be divided amongst the shareholders, and 2000*l.* a-year added to the already enormous reserves in the mine, but the mine from all accounts never looked so well as it does at the present time.—*Tavistock, Sept. 1.* JAMES TOZER.

LADY BERTHA COPPER AND TIN MINING COMPANY.

SIR,—I was in Devonshire last week, and being a shareholder in the above mine I determined to pay it a visit. I was much pleased at the progress made in revivifying this old and once celebrated mine. They are erecting a 45-ft. water-wheel, and expect to have the wheel and pumps in their place and the mine unwatered early in October. The water from the Walkham river has been brought a distance of three miles along an old leet which has been cleared out and repaired, and the water is now at the head of the wheel-pit. Altogether I am convinced this is a Devonshire mine likely soon to come to the front.

A SHAREHOLDER.

VINCENT TIN MINING COMPANY.

SIR,—Being on a visit to Cornwall, I arrived on Monday, Aug. 16 at the Vincent Tin Mine, situated one mile from Five Lanes, Altarnun, Cornwall. Some short distance before approaching the mine the killas ceases, and granite rocks commence. I found the water thoroughly forked in the upper shaft, and going down fast in the lower or engine-shaft, the pumps and plunger-lifts being connected by 1120 ft. of new rods working to perfection and fixed in granite posts—in fact, the mechanical work done by Mr. John Bennett is a thorough masterpiece of engineering. A tramway has also been constructed to connect the upper or Horseborough shaft with the stamps, and the lower or engine-shaft with the same. A tunnel has been driven 100 ft. in length under the county high road (which passes through the sett) to connect the two workings by means of the tramway. The engine is in excellent condition, and is of ample power for all present requirements. After a week spent at the Vincent Mine, and a thorough examination of the lodes both at the surface and underground, I have come to the conclusion that the lodes are rich and productive even at surface. In proof of this I would submit the following facts:—

A qualified mining engineer and mineral chemist met me upon the mine, having been sent there by the directors for their own information and satisfaction. This gentleman, Mr. Percy Tarbutt, M.E., had several holes blasted, and average samples taken of the whole lode at the Horseborough sett, the result of which by careful analysis gave a mean average for the whole of 120 lbs. of black tin per ton of rock. I have also reports in my possession made five years ago by Captain Henry Rodda, of the Devon Great Consols Mine, in which he states "by proper exploration to a reasonable depth below the present point this can scarcely fail to become a lasting and valuable mine," and were any other proof needed the best that can be produced is that there are several miners now applying to the agent to be allowed to work on tribute, as they say they know where to go and break tin-stuff ready to send to market at once, which to the uninitiated means that they will go to work and raise ore, and receive as their only payment a portion of the value of the ore raised. I hear on very good authority that these men made as much as 70*l.* per month on tribute before. The Caradon Mines, which have proved eminently successful and productive, are situated only six miles from the Vincent Mine, and the ground appears to me to be exactly in the same position, and of the same character.

There has been discovered in the course of sinking the bob-pit at the upper end of the Vincent Mines a large caunter lode, which is the key to the mine, and has evidently enriched the eastern end in the manner in which I have seen it, having myself broken large stones of tin ore from this point, the value of which I take to be one-third tin. The caunter lode in Dolcoath Mine, which tended so much to lead to its great success, has I find the same bearings as the caunter lode on the Vincent Mine, and when a cross-cut is driven north to intersect this caunter lode I feel convinced that it will lead to very much larger deposits of tin than have ever been met with on the property, and I have been, moreover, confirmed in this by the opinions of practical miners. The Vincent lodes lie between two elvan courses, and run nearly east and west. The killas comes up and overlies the granite within a quarter of a mile of the mine. On the last day of my visit I found that the plunger which had only been set to work in the engine-shaft on the previous day had forked the water nearly to the 10 ft. level.

I then went down Horseborough shaft to see if there was any change in the character of the lode since the men had been sent to work in this portion of the mine, and I found the lode, which is 1 ft. in from the shaft and going east, making 2 ft. in the bottom. This level was perfectly dry. The men had in a hole and were about to blast. I then went west in 10 fms., and found the lode on the right hand going west and underlying south 3 ft. in 1 ft. This lode was from 3 to 4 ft. wide, containing fine stones of tin and peacock copper. I then went to the surface while the blast was taken in the east end before mentioned. After the smoke had cleared the stuff broken was brought up, and was one-third tin. Some of these stones I have now in my possession. I have also while in the neighbourhood collected evidence from several old miners who have worked upon the Vincent lodes in former times. They one and all agree that there are many places in this mine where men can be set to work at once and raise large quantities of rich tin ore. The stamps for crushing the same are 32 in number, with iron lifters, and are thoroughly suited for their purpose.

I have combined a holiday trip with a business visit in looking after the investment I have made in this mine. If others would do the same there would be less disappointment experienced by those who like myself can call themselves—

A SHAREHOLDER.

MINES AS AN INVESTMENT.

SIR,—There are two conditions to be carefully considered before investing in mines if you wish to be successful in your undertaking. The one is the situation of the mine, the other is the character of the mining captain. I do not say that there are not many others, but these seem to me of paramount importance. A mine situated in the neighbourhood of other successful mines is more likely to prove a prize than one in a new neighbourhood, for this simple reason—that the person making the selection has had the advantage of knowing precisely the nature, character, and strength of the lodes running through the sett, and consequently his venture has many more elements of certainty about it than the other. Costeering may show you that there is mineral, but you must work a lode to know and judge its true capabilities, and then having secured a good mine, unless you secure a good captain you can never have a successful mine. There are some captains who grow rich as the proprietary grow poor; these are best avoided. What is wanted, and there are plenty of them, is a man used to the work who can set a bargain properly, sufficiently educated to keep his books, and who will work well and act honestly as well to the employed as the employer. To enable me illustrate my first position I will take a group of well known mines situated in Cardiganshire, lying close together: these are the Cambrian, the South Cambrian, the Eagle-Eaglebrook, the Hafon and Hendlewh, the Brynadr, and the Camdwr, four being old mines, and two—the South Cambrian and Brynadr—being new undertakings, each most successful in their discoveries, and carried on with absolute certainty because of the knowledge previously acquired of the run and strength of the lodes from the workings in the other mines. My position is not that because the Cambrian has proved a good mine, that, therefore, the South Cambrian in the neighbourhood must prove a good mine; this would be simply ridiculous, but what I do say is that in selecting a mining sett in the neighbourhood of good and proved mines you have information of an absolutely certain character to guide you, and this position is proved by the successful discoveries at the South Cambrian and Brynadr Mines, two of the youngest mines in Cardiganshire, one of which—the South Cambrian—has got its machinery erected, but the other is not quite so far advanced.

With regard to my second position, that you cannot make a suc-

cessful mine without a good mining captain, the proposition is self evident. The frequent stoppage of undoubtedly good mines is due to a weakness on this point than any other. I could name several instances which have come under my own knowledge, but this is not worth carrying further—everyone must judge for themselves. Having found a good mine, managed by a good and honest captain, no investment can equal it, as large returns are certain, as well as a constant rise in the value of the stock.

Manchester, Sept. 1.

A. J. W. STRINGER.

COST-BOOK AND LIMITED LIABILITY.

SIR,—Your correspondents know little or nothing of the subjects about which they seek to enlighten the public. Neither of them have hit the real weakness of both systems. A limited company should not be permitted to commence its business without an adequate capital in hand, and a cost-book company should be compelled to bring all its liabilities up close, and to pay them within four months. The latter rule is already practised in some first-class mines, and I expect it soon will be in all which are worth any attention. The limited mine your correspondent had in his mind was, doubtless, Wheal Coates. He is right in his conclusion, for unless I am much mistaken that mine—which is limited—will pay dividends, and that soon.

INDEPENDENT.

EAST WHEAL ROSE AND CHIVERTON DISTRICTS.

SIR,—You are aware that whenever a mine in any district becomes rich numerous other mines are started around it in all directions. Such was the case in East Wheal Rose district, a map of which I published in 1847. The only mine which yielded any profit in that year and subsequently was East Wheal Rose, although more than 20 other mines were at work in the neighbourhood, the names of some of which I now remember—Penhallow Moor Mine, Rickards' Wheal Rose, Wheal Metha, Rose Consols, Trerew Consols, Arundel Consols, Wheal Acland, South Wheal Rose, South Cargoll, Wheal Mitchell, Wheal Hawkins, North Wheal Rose, Wheal Dyke, North Cargoll, Trewhollack, Rialton, Tolcarne, Trethallan (near Newquay), Newquay Consols, Treloggan Mine, and Morganna Mine.

East Wheal Rose became rich about the year 1844, and continued to give profits for several years, the total dividends being about 300,000*l.* Messrs. R. Michell and Son, Truro, were the pursers, and chief shareholders. I have been told that their share of the profit was little short of 100,000*l.* I heard the late Mr. R. Michell say that he had been speculating in mines for 40 years previously and never received a shilling dividend, always "calls" on him before this. Messrs. Michell, being merchants, sent in all the supplies of coal and timber required for the mine. There were three pumping-engines on the mine, besides several winding-engines, and other machinery. In the year 1847 a waterspout burst over the mine, and deluged the shafts and levels, drowning 40 men. Capt. G. E. Tremayne, of Scorrier, was one of the few who escaped by walking through a level in the dark with the water up to his neck. It was a wonderful deliverance. That accident having caused the levels to close in a part of the mine it was not worked much longer by that company; and Mr. Borrow, lately deceased, who purchased the materials, expended about 40,000*l.* in continuing the work, to their loss to that extent. The mine is supposed to be far from exhaustion, but it would not do to re-open the old levels. If any resumption is attempted it should be by undermining all the present bottoms, and taking away the lead there. Of course, the water would have to be pumped out of the mine. There are four lead lodes near to one another, the whole of which were productive. As to get under the present deep workings, a new shaft would be required nearly, I think, 200 fathoms deep. I question the expediency of attempting any further explorations in the sett. There is not a mine at work in the district at present.

Shepherds Mine (silver-lead) is in this district, about a mile west of East Wheal Rose. Here the late Sir C. Hawkins, Bart., is said to have realised a large sum of money. The silver was extracted on the spot. This mine is believed to be deserving of further working, and but for the dispute between the late Bishop of Exeter and Mr. C. H. T. Hawkins it would have been re-opened long since. The legal dispute being settled a sett may now be had from the Ecclesiastical Commissioners, through their agent, Capt. Josiah Thomas. Except East Wheal Rose and Shepherds, there was not a mine in the district that was self-sustaining, consequently the losses were very considerable in the aggregate. Only two or three of the mines were fairly opened up.

Analogous to East Wheal Rose is the West Chiverton district, where numerous mines were opened because of the richness of that mine, but not one of them paid its way, and the only mine, except West Chiverton, now at work in the district is East Chiverton. By perseverance this mine has been kept at work many years by calls on the shareholders. The prospects are now said to be very good, and it is believed that ere long they will be rewarded for their outlay, which they deserve. North Chiverton, Chiverton Moor, Mineral Bottom, Wentworth Consols, South Chiverton, Great South Chiverton, Goonhavern, Wheal Albert, Perran Wheal Virgin, and many other mines, are included in the Chiverton district. I am of opinion that West Chiverton will not last a great while longer, although I should be glad if it did. It seems to be almost exhausted of its stores. It has been a good property, and many persons have become rich by it. It is said that the 30,000*l.* received by Mr. E. Burgess for his one-third of the lease has been lost in a paper manufactory near Wells, and he is now said to be a poor man—worse off than he was before he purchased (jointly with two others) the lease of the mines. Such are the ups and downs in life. A mining man never says "it is enough" when he makes his fortune, hence many who become rich by mining by fresh speculation become poor again; but Capt. Teague is one who is not likely to follow such examples. He knows how to retain a fortune when acquired, and he certainly has acquired a large one in a brief period by perfectly legitimate means, and for that reason it is the less likely that it will be taken from him.

Truro, Aug. 26.

R. SYMONS.

MINING REDIVIVUS—CARDIGANSHIRE.

SIR,—The products of the earth are twofold—on the surface grow the cereals and plants employed for the use of man and beast; and beneath the surface lie the hidden mineral treasures which constitute man's wealth. Neglect the first, and how are you to secure the second. Cease to sow, and perforce you must cease to reap, and famine and decay take the place of wealth and plenty. After a season of unusual wet we have emerged into some weeks of brilliant harvest weather, and the farmers, we are told, are about to gather in the spoil of the field, richer than the two last summers have produced. National prosperity promises once more to be in the ascendant, with "health and plenty to cheer the labouring swain." With so much to be thankful for from the fruits of the earth, we should not, as a nation, neglect its internal riches, and more especially those which a beneficent Providence has placed beneath our feet in our own highly mineralised land. Mining I consider is, next to farming, the most legitimate of our national occupations, and those who neglect it "throw away a jewel richer than all their tribe." There is, of course, mining, and mining. There is mining, alas! where no mineral is ever expected to be or is found. There is a species of mining which never gets beyond a prospectus and a bank account, and there is mining where, with a recklessness unparalleled, we heap up our thousands and thousands to develop the mineral resources of foreign countries, whose only mineral turns out to be that which John Bull sends them from the Bank of England.

Passing through the richly mineralised county of Cardigan it is said to see so many mines now idle which were once the scenes of busy honest labour, giving forth riches which well rewarded the spirited adventurers of the day. Even mining enterprise has keenly felt the great commercial depression which, like a thick black fog, has crashed down trade and every form of enterprise during the past few years. But the heavy oppressive mist is slowly but surely rising, and a gleam of sunshine struggles through its haze. I am glad to see, even though on a small scale, that the experience of former years is gradually leading back mining capitalists to this favoured county, where there is little doubt that they will repeat again those great mining successes which have made the county famous.

The old Bwlch Mine has again sprung into life, and under the title

of Bwlch United is once more, and under excellent management, preparing to repeat its tale of untold wealth. Here it is cheerful to observe mining life renewed, and to notice the activity displayed on the dressing-floors, which from the quantity of ore not only at surface but coming up daily, have their work cut out for them for some months to come, even without the addition of another ounce of ore. I understand that the same parties are about working another property west of the Lisburne Mines in the Lisburne district, and on the same lode, thus appropriately named West Lisburne. This mine, which has been idle for some years, was, I believe, left productive by the last workers, and, if my memory serves me, was always well spoken of in the old times, but at all events it is in a good district, and judging from the way they have so successfully managed Bwlch, I should say it is in good hands, and will prove another of Cardiganshire's rich prizes.

MINING IN CARDIGANSHIRE—WATER SUPPLY AND STORAGE.

SIR.—I have often to go across the hills in this neighbourhood, and have been impressed with the system of water-courses for such a great length, and with the large amount of storage, by which means from 25 to 30 powerful water-wheels in succession are kept going for a great portion of the year, and deep and extensive mining operations made possible and regular. This system of water supply is especially of great and constant benefit to the Goginan Mine and its neighbour, the Bwlch United Mines. On the latter there is an application—or, rather, transfer—of part of the power of their 50-ft. water-wheel by rods, to another site nearly destitute of any regular supply of water, to a large ram pump for revolving it, which makes up the deficiency, and is the means of working a 40-ft. wheel for crushing and other dressing appliances, being in effect an efficient supply in itself for marketing large sales of ore.

Yesterday a party of gentlemen connected with the Court Grange and Mynydd Gorddu Mines paid a visit to a large reservoir just completed for supplementing the supply of water to their mines. This work has been thought necessary, as all the higher waters of the (and) and other tributaries of the Rheidol were secured many years since by Mr. John Taylor and his advisers. More reservoirs will be necessary in the higher minin districts about Camdwr Mawr, so as to afford means for bringing several properties in that locality into a state to make good returns, in one of which, Bryn-yr-Ayr, capital discoveries of lead ore and blende have been made. I hear of a probability of the Havan and Henfwich Mines being re-worked, and if so the result need not be feared. The ore is there, only waiting capital to put the workings in order.

Goginan, Sept. 2.

ALL ABOUT TIN.

SIR.—Through all the recent market operations there has not appeared any power equal to putting the price very far away from 30s. per ton, about which it has now stuck for some time. With this price tin mining in Cornwall is pretty safe, especially in the mines of moderate depth. This could not have been said two or three years ago, for at the ruinous prices then prevailing time would have told on all of them. The danger which appeared as threatening them having happily passed away, and tin mining having again been brought to a prosperous state, it is not time that some other things be considered to promote the protection of the lives of the thousands of miners employed? In working rapidly with rock-drills and strong explosives, both of which are more and more daily coming into favour, the liability to accident from premature and erratic explosions has been largely increased. As many of the accidents in blasting arise from the detonator in use, I think it is quite time for us to ask of science to supply us with a detonator which shall be infinitely more safe in use than the present "murderous article." As we always employ a spark to explode the detonator, we require one that can only be exploded by a spark, and that is not at all liable to explode by concussion. With such an instrument blasting operations can be carried on in comparative security, and many lives now sacrificed to a quality in the detonator not required may be saved.

Aug. 31.

W. TREGAY.

LEAD MINING IN LLANARMON.

SIR.—On Saturday last I am pleased to tell you that one of the directors went to the Lady Ann Lead Mines, accompanied by Capt. William Francis, of Northop, and the chairman and secretary of the Lady Ann Silver-Lead Mining Company, on a visit of inspection. The day was remarkably hot, though the drive to the mines was a pleasant one on the Ruthin-road past the logger heads and through the shady lanes of the Llanarmon-road from Mold. By the intelligent guidance of Capt. W. Francis many points of interest were noted on the way, and when we arrived at the Lady Ann sett, about 10.30 A.M., the boundaries and other surface points were carefully pointed out, but the greatest interest attached to his lucid and intelligible description of the underground workings and their appearances, three points of special interest being marked out for particular attention by the new company. The place of greatest attraction for the day was the work being done at Francis's shaft in the 30 yard level on the Westminster vein, where beautiful specimens of lead ore and other congenial mineral compounds are increasing in strength as the men drive on. The Chairman brought away with him a nice specimen of lead ore, taken from the string of ore in the roof of the level. We were all very well pleased with all that was explained and seen, and came away determined to do our best to make the Lady Ann Silver-Lead Mining Company a success. The property has all the elements of success in it, and the directors, agent, and workmen are determined by all that lays in their power to make it a successful company. As a further evidence of the value of this sett as a mineral property, I have much pleasure to send you the accompanying report, and I may here say that the secretary of the company, Mr. W. Booth, accountant, Victoria-street, Oldham, will gladly give any further information to anyone desirous of taking shares in this promising company.

Lady Ann Mines, June 29.—No. 2 Report: I have to-day carefully examined this mineral property in the Nant-y-Palme estate, in which I find all the four main lodes (worked so extensively and profitably in the Old Westminster Mines in length, whilst further on to the west rich bodies of ore have been worked to the boundary of this sett, thus proving them to be rich on each side to the east and west. In the latter workings a good course of ore has been left dipping eastward and running into this property, whilst again at the eastern end there is now a fine course of ore laid open within 100 yards of the boundary that will produce 2 tons of lead ore to the fathom, and it is taking a direction so as to run through the Lady Ann Mines for some hundreds of yards in length. Looking at these facts the success of this undertaking may be viewed as certain, and involving only a question of time in its accomplishment. There are other points of special interest which I will briefly explain.—1. Laying open the Westminster lode from the shaft you have already sunk 30 yards deep upon the junction of this with Francis's lode, where a small rib of lead ore has been cut through (18 in. long by 3 in. thick, solid) in sinking the shaft, and the vein found ore for nearly the whole depth. A 30 yard level has been driven eastward from the shaft just below the junction and on the Westminster lode, which shows the finest mineral producing indication, and from which good specimens of lead ore are now being met with. I have very strong hopes that a discovery of a good run of ore will speedily reward your efforts here.—2. The next point I would mention is to discover the run of ore at the eastern boundary, which no doubt will become far more valuable even than it has yet proved on the western part, where it was formerly worked rich. A good whim-shaft has been sunk 50 yards deep for this purpose, and a cross-cut driven south intersecting two main lodes, and nearly as far as the Pant-y-gwlad lode. On one of these lodes a level has been driven for 80 yards in length; it has, however, failed to intersect the run of ore before alluded to, but there is no doubt this has been driven on the wrong lode, and that when proper drillings have been made from the old workings a small expenditure in driving a cross-cut into the other lode will speedily lay this rich run of ore, and render this portion of the mine at once profitable. It will be seen that already a considerable outlay has been incurred in sinking the shaft and driving towards this desirable object, thus saving time and a considerable outlay in its accomplishment.—3. I now have to point out the third, and I consider the most important point—opening up a shaft at the eastern portion of the sett sunk 45 yards deep into the main Pant-y-gwlad lode. After upon this celebrated rich lode only a few yards have been driven westward where the ground rises fast, and considerable backs would soon be gained. The driving on this lode westward where lead producing oblique joints and feeders would constantly fall in as junctions to it, and cross-cuts put out at convenient intervals to the three other lodes would, I have no doubt, speedily and amply reward the necessary outlay for this purpose, and develop one of the best and most important mines in the district, as the four lodes so laid open are those which have produced such immense wealth in the adjoining Old Westminster Mines—the Westminster lode, old lode, Pant-y-gwlad lode, and the south or Bog lode.—BENJAMIN WILLIAMS, Gwern-y-Mynydd Lead Mines, Mold.

It affords me much pleasure to lay before your readers such testimony as the above, which needs no further comment from me; and if you will kindly allow me in future numbers I shall esteem it a

great privilege indeed to give the reports of Capt. Absalom Francis, of Gwern-y-Mynydd, and Capt. Enoch Parry, of Pant-y-mwyn, near Mold, on the Lady Ann Lead Mines.—Aug. 30.

ENQUIRER.

[For remainder of Original Correspondence see this day's Journal.]

Meetings of Public Companies.

TANKERVILLE MINING COMPANY.

The ordinary general meeting of adventurers was held at the mine, on Tuesday, Mr. PETER WATSON (the Chairman) presiding.

The CHAIRMAN said—Gentlemen, I think I may congratulate you on having a glorious sun and such splendid weather for our visit to the mine, and I hope we may look upon this as the forerunner of prosperity not only for this mine and this district, but also as an augury of the welfare of the country at large. (Hear, hear.) I think we, as Englishmen, should feel very grateful for the fine weather which we have enjoyed for the past four or five weeks, because I have not the slightest doubt it will have a most beneficial effect upon the trade and prosperity of the country at large. You and I know—and no one knows more than myself, having a large interest in this undertaking—what we have had to go through during the last three or four years, and more particularly during the last 12 months; but I think we now see a little blue sky, and I hope and believe the time is coming when there will be a great rebound for the industries of this country, and for none more so than for the wealth which is brought from the bowels of the earth. In estimating the probability of future prosperity we must not forget to take into account the magnificent harvest which, I think we may say, we are blessed with—(hear, hear)—for not only are wheat, barley, and other crops abundant, but there is also an abundant yield of various other produce, which we should be thankful to the Almighty for. (Hear, hear.) We will now proceed to the business which we are assembled to-day to transact. Every shareholder has had a copy of the report of the directors placed in his hands. In the report you will find my name very prominently connected with a recommendation therein contained, and I may tell you at once that although, as Chairman of this company, it is my proper place to preside over you on this occasion—(hear, hear)—yet I assure you I have felt some diffidence in occupying the chair to-day. I would much rather that one of my co-directors had occupied this place. I have asked them—I have almost pressed upon each individual director that he should preside, but all have declined to do so, and have expressed their opinion that there is nothing but what is proper and right in my occupying the position of Chairman of the meeting to-day. (Cheers.) At the same time, if you think I should vacate the position of Chairman of this meeting, and allow anyone whom you may appoint to come here and occupy this place, I shall be most happy to do so. (No, no.) Well, if it be your wish that I should conduct the business of the meeting, I assure you that I will do my best to enlighten you with respect to the position and prospects of this property, and also of the two undertakings which are adjoining to this property. (Cheers.) To put the meeting in order so that we may proceed with business, I will now call upon the secretary to read the notice convening the meeting.

Mr. J. H. MURCHISON read the notice calling the meeting.

In compliance with the wish of the meeting, the report of the directors and the accounts were taken as read.

The SECRETARY then read the following report from Capt. Arthur Waters:

Tankerville Mine.—A. Waters, Aug. 30: Having made a minute inspection of the mine to-day I can now give you the latest news and full particulars as to the present state and future prospects of the property. The 220, west of Watson's shaft, is driven about 27 fms. 3 ft.; lode in present end 6 ft. wide, composed of carbonate of lime and lead ore, and worth 10s. 10s. per fathom. We have not yet reached the junction of Robert's lode with the main lode here, but we are looking out for it daily, as well as for an improvement in the value of the ore ground. The two stopes in back of this level adjoining winze west of shaft are worth together 25s. per fathom. The 225 east is driven altogether about 35 fms.; the lode in the forebrest is about 5 ft. wide, composed of nice looking spar and lead ore; worth 10s. per fathom. The two stopes in back of said level east are worth together 20s. per fathom. The two stopes in bottom of the 206 east are worth together about 50s. per fathom. The No. 2 north lode in the level driving east and west of the cross-cut in the 206, west of shaft, shows a kindly appearance, but there is not sufficient lead ore at present to set a value on. The rise in the 266 west going up on the junction of Robert's lode is worth about 10s. per fathom. In the 182 driving south on new lode parallel to the shale the forebrest is worth quite 21s. per fathom, and the lode looks promising for further considerable improvement. This lode is quite a new feature in the mine, and the least I can say is that if it continues productive as at present from Tankerville up to and across the Pennerley lodes (and it bids fair to do so now) great things are in store for us here. This lode is in whole ground from surface to the bottom of the mine, hence the 182 south is a point of the highest importance to the company. There are 18 pitches at work by 38 men, at tributes varying from 9s. to 12s. per ton, the average output from these being 25 to 27 tons of lead ore per month. The total quantity of ground excavated in sinking, driving, and stopping from the commencement is as follows:—Sinking Watson's shaft from surface, 281 fms. 4 ft. 1 in.; sinking winzes, 268 fms. 2 ft. 9 in.; driving levels, 923 fms. 2 ft. 8 in.; driving cross-cuts, 150 fms.; stopping, 383 fms. 0 ft. 7 in.; total, 5316 fms. 4 ft. 1 in. The output over the same period—February, 1870, to June 30, 1880, is as follows:—Sales of lead ore, 14,190 tons 12 cwt., 189,144. 9s. The sales of ore for the financial year ending June 30 last were 950 tons, realising 10,172. 15s., and No. 2 quality, got from the waste heaps, 100 tons, realising 863. 12s. 6d.; together for the year 11,036. 7s. 6d. The average yield from the mine underground to June 30 has been in round numbers 2 tons 9 cwt. 3 qrs. of lead ore per fathom for all the ground cut in the mine realising 132. 5s. throughout. We have paid, as stated in a previous report, about 58,000l. in dividends, spent some 25,000l. to 30,000l. in sinking Watson's shaft, putting down pitwork, erecting engines for pumping, winding, and crushing, and in the putting up of numerous modern appliances for dressing the ore, and had the price of lead ore kept up to the figures given above—to 13s. 5s. per ton, we should even now have had a good account to give to the shareholders. The present state of the mine, however, will not admit of our paying cost at 10s. 10s. per ton for the ore, and unless we can have capital—say about 5000l.—to enable us to deepen the shaft and cross-cut to and through the old lodes, I really cannot say what the upshot will be. Total number of hands employed in and on the mines, including agents, 172.

The CHAIRMAN said—Gentlemen, I think the best and most convenient way of proceeding would be to deal, in the first place, with what has been done in the Tankerville Mine during the past 12 months, and with its present position. You will find that from the 26th April, 1879, to the 24th April, 1880, we sold 1005 tons of lead ore, at an average price of 10s. 2s. 6d. per ton, as against 1080 tons sold in the corresponding period of 1878-9, at an average price of 9s. 15s. 3d. You will remember that 12 months ago negotiations were going on with respect to royalties, and after many long negotiations we got 394l. 6s. 8d. struck off the royalties. So much with regard to the debenture side of the revenue account. On the other side there is 12 months' cost to end of February 1884l. 6s. 8d., royalty on ore sold 338l. 3s. 9d., income tax 115l. 6s. 6d., and sundry other payments. As regards the price of lead, as Capt. Waters, in his report, has told you, if we had had during the past two or three years anything like a price for our ores we should be now in a very different position to what we are, and instead of coming forward and asking for further capital to throw out further cross-cuts, sink shafts, and so forth, we should be in a much better and more promising position. But so it is. The directors have themselves had to find money to the extent of 2000l. to carry on the mine, and they have done so in the belief and hope that at this meeting you would do something by which those liabilities would be paid off, and also give us further capital to the amount of the very moderate sum of 5000l. Considering what this mine has done in respect to the return of ore, particularly from one lode, and seeing that we have got so many lodes in this sett and close by, and after going to the enormous extent of sinking a shaft to the present lode, it did seem rather cowardly on our part if we did not find the means to carry on the works. Perhaps I ought not to say "cowardly," because it is nothing of the sort, and I know you will give us the means of cross-cutting to the other lodes. (Hear, hear.) If one lode has produced so much it cannot be doubted that the other lodes, which are close by, will prove equally productive. The small amount of 3000l. will pay off all the liabilities, and 5000l. would develop the mine. It is a moderate sum, and it will be the means not only of resuscitating this mine and making it a very valuable property but will also enhance its value very considerably. (Hear, hear.) That is really the position with regard to Tankerville, and it is for you to-day to say whether you will adopt the report and find the capital, or suggest any other means by which the debt can be paid off and the necessary capital provided for the further carrying on of the mine. I may say that as far as I am concerned I certainly like the prospects of Tankerville much better than I did 12 months ago. Only recently we

have got into a north and south lode. The lodes here are east and west; in the Roman Gravels they are north and south. Now, we have got a very distinct and important feature in this north and south lode in the 180 fm. level, and I am told it is worth about 2 tons of ore to the fathom, and if it continues to hold out—as we anticipate it will—it will be a good thing for us. If we get the capital—as I hope we shall do—we shall set to work and see if there is any ore in the upper levels. (Hear, hear.) So much with regard to Tankerville. The important question to be brought before you to-day, as you will have seen by the report, is with respect to uniting this property with the Bog and Pennerley. I must tell you before I proceed further that the Tankerville Company has no power whatever under its present constitution of issuing any fresh shares by which we can raise any further capital; therefore, whatever is done it will be necessary to wind up the Tankerville Company. Whether you unite with the Bog and Pennerley, or whether you work Tankerville by itself, Tankerville must be wound up, because you cannot according to its constitution issue any further capital. The Memorandum of Association gives the company no power whatever to issue fresh capital; therefore, as far as that is concerned it must be distinctly understood that there is no other means of raising the capital. We tried 12 months ago whether we could do it, but we could not succeed. With respect to this important question regarding the Bog and Pennerley, I cannot do better than read the fifth clause of the report:—

"Mr. Peter Watson informed your directors that during the last two years he had been negotiating for the purchase of the Bog and Pennerley plant and machinery, with the intention of working the mines as one united undertaking, and having secured these he has now given his consent to an amalgamation with the Tankerville property for the sum of 8000l.; of this sum 7000l. is to be paid to him in cash, and the remainder 1000l. in fully paid-up shares, on the understanding that the following arrangement be forthwith carried out in the formation of a new company to take over the purchase of same, and likewise the Tankerville property, as follows:—A company to be formed with a capital of 110,000l., in 110,000 shares of 1l. each as follows: Shares 36,000, to be allotted for part purchase of Tankerville property to the Tankerville shareholders in proportion of three fully-paid 1l. shares for each share now held—36,000 shares of 1l. each, 36,000l.; 36,000 shares to be subscribed for and paid on in cash; 36,000 shares bonus to be given to subscribers to the last-named 36,000—share for share; 1000 fully-paid shares to the vendor of Bog and Pennerley plant; 1000 shares to be applied towards incidental expenses as below: total, 110,000 shares. This capital would be appropriated as under:—Part purchase of Tankerville property as above, 36,000l.; purchase of Bog and Pennerley plant and machinery—cash, 7000l.; and 1000 fully-paid shares of 1l. each, 1000l.; to pay Tankerville debts (say) about 3000l.; working capital remaining for the three mines, 26,000l.; are still progressing for new lease on much more favourable terms. It may be mentioned that several of the largest shareholders have already intimated their full approval of this plan, and their intention to support it."

That is a short but, I think, a clear statement of what is proposed. I may tell you that for more than three years—in fact, since July 16, 1877—I have been negotiating for the purchase of the Bog and Pennerley Mines. I have done everything I possibly could to purchase those properties. My idea was to work the Bog and Pennerley Mines unitedly, and to have given the shareholders in Bog and Pennerley the option of coming in on certain conditions, and also to give the shareholders in Tankerville Mine the opportunity of likewise coming in. That was my intention when I got them. And why have I negotiated so long a time to get these properties? Simply because I believe them to be very valuable. (Hear, hear.) They were very valuable, and I believe they are still very valuable. (Cheers.) The Bog Mine was worked by the Walkers many years ago, and it was then very rich indeed, but they had not sufficient money to go on with it, and ultimately the mine was stopped. It was always said that there was a very rich lode indeed there, and capital was subscribed to put up large machinery. Some of you gentlemen have been up there to-day, and you will have seen the large engine which was put up by the late company, and an enormous amount of valuable machinery is also there, which cost a large amount of money, and no sooner did they put it up and work down than they found a course of lead ore worth 4, 5, 6, and even more tons per fathom. The mine is still rich at the bottom; if they had had a few thousands more to go on with, and open up the mine in a proper manner, there is no doubt that the old mine in itself would have become a very rich mine indeed. (Hear, hear.) The riches, no doubt, are there still. With respect to the Pennerley, directly the Bog stopped the water came back to Potter's Pit, and knocked off 40 tons per month from the getting of that. Just at that time, too, the Buryport Smelting Company unfortunately stopped, and there was a loss of some 1000l. Just at that time, also, there was an accident to the piston, and it let the water in; but at that time there were courses of lead there in Bog, worth from 3, 4, 5, to 6 tons per fathom. There were also courses of lead worth from 3, 4, 5, to 6 tons per fathom in Pennerley. I have reports from the late manager of the mine, which you, in all probability, will hereafter see—or, at any rate, extracts from them—and they are all satisfactory. I have also had consultations with engineers and eminent mining men. I have not taken Capt. Waters' opinion alone, but I have also taken the opinion of men well versed in all matters connected with the mining of the district. I will not say so well acquainted with it as Captain Waters, because I do not think there is any man who knows so much about it as Capt. Waters; but I have thought it right as a Chairman, and for the purpose of informing you, to obtain the services of thoroughly independent men, in order to be able to go into the matter, and all concur in saying that it would be one of the finest things possible to unite these mines. (Cheers.) I consented to this. I did not propose it myself at once. I bought those mines myself and paid for them. I may say that Mr. Greame and myself talked the matter over at my office as to whether we should unite them, and I said I had no objection. I then stated that 9000l. would have to be paid me in cash, but I have now consented to take 7000l. in cash and 1000l. in fully paid shares. If the scheme is carried out a large amount will be saved for labour and other expenses which you cannot now foresee. Of course I am a large shareholder, and many of my friends are large shareholders, and my co-directors have also a large stake in Tankerville. The directors went over the mine and examined the machinery, but nothing final was decided then; but we adjourned the debate until we came to London, and finally it was settled. We had several interviews as to what was to be done, and finally we could come to only one conclusion. I will say this for myself that it is entirely for the shareholders to decide whether they will accept this proposition or not, or whether they will bring any further proposition. The directors will be willing to listen to and receive any practical proposition from you or anybody else. By circular we have asked all the shareholders to attend here to-day, with the view of giving their views upon the subject. I may say that one shareholder says that he does not exactly see his way to agreeing to it, whilst there are two others who say they do not oppose it, but at the same time they say they should have raised the money upon better terms, thinking that the property is so valuable that the money should be raised without any bonus being issued. On that point I will say, first of all, that 36,000l. represents the market price of Tankerville. Capt. Waters said it is worth 50,000l., but of course you never get full value in cases of this kind, but I think 36,000l. represents the fair market price, and so it seems to my brother directors. (Hear, hear.) One director thought it better to give a little more, and the other directors thought it did not matter, as you have the same interest in it. With respect to the subscribed capital, you know what is to be done with it. There would be about 8000l. to go on with, which would last at least six months, and it might last something more, but we do not bind ourselves to this, but there will be amply sufficient for six months; and, as I have said, perhaps more. (Hear, hear.) Now with regard to the bonus shares. The bonus shares are given to those who subscribe the 36,000l.; and assuming that every shareholder takes his interest, and considering what he had paid for his shares—6s.—why should not he have his bonus in connection with coming forward to subscribe? Supposing he did not do it, and supposing every shareholder said "I will not do it," we have had some intimation that other people will come forward and find the money to develop the property, and thus render it more valuable by developing it. If you carry on

business in a large way, and if you require more money to carry on your business, you must take it in on fair terms. Therefore, I think the present proposition is equitable, just, and fair. (Hear, hear.) There are one or two shareholders who think that we ought not to give so many free shares. Well, that is a matter of opinion. I think it a right, fair, and straightforward way of doing it. If we all take our shares we are in the same position; if not you ask other people to come in and help you. We shall require 5s. on application and 5s. on allotment, which would pay for the Bog and Pennerley plant, and also pay the debt, which would be equivalent to giving you 3s. for your shares if you do not provide the money. The report states that "negotiations have been for a long time and are still progressing for new leases on much more favourable terms." That is so. Letters innumerable have passed on the subject, and I have been down at least a dozen times to see Mr. Howe on the subject, and to see what we could do with respect to these leases. I had a letter last Saturday, and wrote a long one to Mr. Howe in connection with the matter, placing the whole matter before him, and this morning I have received a favourable reply on the subject. It is not quite the reply I anticipated, but the language in which it is couched is very favourable. (Hear, hear.) So I think there will be now no difficulty in coming to a favourable adjustment. Particulars were sent last week to the lords' agent, by whose opinion they will be guided; he is the manager of Snailbeach here, and he has been here on behalf of both lords, to see what would be a fair and just rate of royalty. I shall be quite ready to fall in with those views, because he, as manager of a lead mine, must know the difficulties we have had to contend with with respect to the price of lead, the same as other lead mines; therefore, I think his opinion is worth having, as he is a man who has been associated with Snailbeach for a great number of years, and whose opinion is very much respected. (Hear, hear.) Having said so much, I do not know that I have anything more to say; but you may ask me—"Mr. Watson, what did you give for this property?" Well, now, if you go into a shop to buy a ham you cannot ask the seller—"How much did you give for that ham?" What would the reply of the seller be? The reply would be—"You cannot ask me what I gave for it; if you like to take it at the price you can do so, but if you do not like to take it I am not going to press it upon you, but you can go to the next shop." (A laugh.) Well, so far as I am concerned, I am perfectly lukewarm as to whether you accept it or not. I say emphatically I believe that if you do accept it, and if these mines are worked unitedly, you will have as great and profitable a mine as any in the country. (Cheers.) That is my candid opinion, otherwise I should not come here at all and say so. If I consulted my own individual feelings I say I would give up Tankerville, and Bog and Pennerley, and leave the district entirely, and the other mines as well. If it is your wish that I should vacate this chair as Chairman, or give up my direction, I am at your beck and call, but as long as I am connected with you I will do that which I believe to be right, and tell you what I believe is the best for your interests. I say that never has such an opportunity as this happened, that you have been offered these properties—properties which were selling a few years ago from 100,000l. to 130,000l., in which you know you have rich courses of ore, where in Bog alone they returned from 300 to 400 tons of lead ore per month, besides blende, but the blende was not then very valuable, but now I may say that about 6 tons of blende are worth 2 tons of lead. That is about it I believe, Capt. Waters?

Capt. WATERS: About 3 tons of blende is worth about 1 ton of lead. The CHAIRMAN: So far as Pennerley is concerned there is no doubt that Pennerley is a very rich mine, and to show you that it is a rich mine I may mention that in six years they averaged 700 to 800 tons per annum, which was sold for 62,370l., and the selling price of the mine was between 40,000l. and 50,000l., and then there was not more than 1500l. of working capital, and after sinking the shaft a few feet they got out, as I have said, 62,000l. worth of ore. It has gone down rich at the bottom, and all you have to do is to sink the shaft and get under the course of lead. There is the machinery there, and all you have to do is to commence opening up at once. As far as the Bog is concerned there is a large amount of machinery in the shaft already fixed. You ask me what I gave for it. I never had that question asked when, after long negotiations, I and others became the purchasers of the Roman Gravels for something like 50,000l. In 1873 I find in the *Mining Journal* that I stated this with regard to the Roman Gravels:—

"Mr. Peter Watson said the report was very explanatory, and equally satisfactory. He was at the mine with Capt. Waters on Friday, and as auditor went through the books, and it would be satisfactory to the shareholders to know that everything had been charged up to the end of March, and that the manner in which the books were kept reflected the greatest credit upon the management. As the principal negotiator, and one of the purchasers of the property from the old company, it afforded him great pleasure to see the continuously satisfactory progress the mine had made. The mine had been developed in a most remarkable manner, for it was only in October, 1871, the company took possession, when there were only 500 tons of ore in reserve, but in the short period which had since elapsed the value of the reserves had increased to 500,000l. During the first year the company had sold 1531 tons of lead, at an average of 12s. 7d. per ton, realising 19,916l. and a profit of 8427l., out of which two dividends of 5s. per share were declared, and in the second year 2026 tons were sold, at an average of 14s. 6d. per ton, realising 30,000l., and a profit of 16,652l., of which three dividends had been paid of 6s. per share, and one was in course of payment of 7s. 6d. per share. The report on the mine speaks for itself."

Then Captain Waters went on to say, in his report in 1873—

"The present reserves were worth 507,370l., and he believed they would go on doubling, or certainly largely increasing, their reserves for the next 12 or 15 years. He told them two years ago that they possessed a rich mine, and at the last annual meeting he valued the reserves at 250,000l.; to-day that amount was doubled, and he saw no reason whatever why they should not go on as they had during the last two years, until Roman Gravels was a mine equal to Van." Well, that had turned out to be quite correct, for they are now sampling at Roman Gravels about 230 tons of ore, against 200 tons at the Van Mine. The Roman Gravels is selling at 250,000l., and the Van at 300,000l. I do not say which is the cheapest, I was not asked what I gave for Roman Gravels, but it was sold, and we made a very large profit out of it. The shares went to 22l. each, or 260,000l. for the mines, or about three times more than what it was sold to the company for. I must say that Capt. Waters has worked manfully in Roman Gravels, and placed us in a position here second to that of no other mine in the country. (Cheers.) I say that most distinctly. You know what Roman Gravels was when we took it, you know the large amount of machinery which has been put up, and you know what Roman Gravels is now. You also know there has been very uphill work to contend with. There has been a great deal to do to bring it into its present state. We know we have a rich course of lead; but I say take Pennerley, or take Bog, or take which mine you like out of the lot, and I say it is as good as Roman Gravels when we gave 47,500l. for it. (Cheers.) Now, gentlemen, I am going to say this. If there are any questions to be asked I will answer them, and I am not going to get warm on the subject at all. I come here and place this proposal before you, and it is for you to say whether you will accept it or not. If you do not like to accept and carry out the arrangement which is offered to you, and which the directors have been enabled to lay before you, well and good; if there is any other proposal which you can bring forward better than that by all means adopt it. We do not want any unnecessary feeling in the matter. It is simply a question of "Aye" or "Nay," and it is for you to agree to it or not. But do not let us have any unnecessary obstruction with respect to this matter. (Hear, hear.) It is entirely a matter for you as shareholders to decide. There are a great many shareholders not present to-day who fully endorse it, and who will not only take their own interest in it but will also take the shares of those shareholders who do not desire to subscribe. (Hear, hear.) Gentlemen, I have done my best to bring this matter before you for discussion; we are met here for discussion, but let us discuss it temperately, and not import any feeling into the matter. (Loud cheers.)

A SHAREHOLDER: Did I understand you to say that if the shareholders do not take the 36,000l. there are other people who will?

The CHAIRMAN: What I said was that several of my friends have signified their intention to take more than their proportion of shares if there are any not taken up, and certainly I shall not only take my proportion as a director but in all probability a much greater number if I can get them. (Cheers.)

Mr. WM. COOPER moved that the report and accounts be received and adopted, and printed and circulated amongst the shareholders.

Mr. W. GREAME (largest shareholder) seconded the resolution.

Mr. CREMONINI (of Wolverhampton) said he admired the "form"

in which the Chairman had congratulated the shareholders upon the sunny weather, and the way in which he had expressed the hope that it might be a good augury for the future of the Tankerville property; and he was pleased to meet the Chairman so far from London, looking so well and cheerful, and not only did he admire the form in which the Chairman started his speech, but he had been very pleased indeed when he had, from time to time, read the speeches of their Chairman at other meetings, at which he (the speaker) had not been present; and, therefore, although there were two other meetings of more account which he ought to have attended, he took such an interest when he heard that the Chairman was to take part in anything of importance that he did not mind travelling some distance on purpose to hear him. (Hear, hear.) But he certainly must say that he disagreed with what the Chairman had said regarding a person who, if dissatisfied with the price of a ham at one shop could go to another shop and see if he could get it cheaper, because he contended that it was the Chairman's duty, as a director of the company, if there was any bargain to be made on behalf of the shareholders to have informed the shareholders of what bargain he could have made on their behalf; and, therefore, he thought the Chairman, having, as it were, a private interest, ought not to have presided over the meeting to-day. He failed to see that the Pennerley had been the valuable mine which the Chairman described. He was not come here to throw any damper upon Tankerville, for he was too largely interested to say anything to injure the property, but looking at the state of trade generally, he certainly could not see his way to work the adjoining mines with the Tankerville in the way proposed by the Chairman and directors. He would stick to the ship as long as he was able, and if there were really a necessity for fresh capital in Tankerville, he suggested it should be obtained by a reorganisation, or some other scheme other than the now proposed. Having referred to the fact that he had been at one time on the board of Tankerville, and stated that he retired because he could not approve of the policy of his co-directors, he went on to suggest that possibly money might be found to carry on Tankerville by the issue of preference shares, to be offered in the first instance *pro rata* to the existing shareholders. This had been done in some other companies, and he certainly did not see why it should not be done in this; but he could not see his way to enter upon the gigantic undertaking now proposed for the approval of the shareholders.

Mr. COOPER, who said he had but a small interest, said he thought it was a proper question for Mr. Watson what he paid for the Bog and Pennerley mines. He thought Mr. Watson, as Chairman of the company, should have bought the properties on the best terms he could for the shareholders.

The CHAIRMAN: I must most emphatically call this gentleman to order. I bought those properties purely as a private speculation for myself. I began negotiations for them two years ago for the purpose of working them together. I bought Roman Gravels; I might have bought any other concern without consulting the Tankerville shareholders. I have a perfect right to do that. I did not buy these properties with the intention of even offering them to be bought by this concern (Tankerville Company). I simply give the shareholders of this concern the refusal on certain conditions. (Hear, hear.)

Mr. COOPER said that without at present expressing any opinion regarding taking over Pennerley and Bog, he certainly thought that before any definite steps were taken in the matter by the shareholders they should hear some of the independent reports which the Chairman said he had obtained regarding those two properties. He did not say this in any captious spirit. He had never had the pleasure of seeing the Chairman before, and, therefore, could have no feeling towards him, but he simply acted as he had a right as a shareholder in doing, in asking for more information.

Capt. ARTHUR WATERS: I may mention that when this matter was first mooted I suggested that the question should be thoroughly gone into by outside men, thus relieving me of all responsibility. Those independent outside men were called in, and Mr. Watson is in possession of their reports, and I shall be delighted if they are presented to the meeting. (Hear, hear.)

The CHAIRMAN said that if a proper spirit were shown he should be delighted to read to the meeting extracts from those independent reports. (Cheers.)

Mr. GREENSILL (Wolverhampton) said he thought the Chairman had a perfect right to refuse to answer the questions as to what he had given for the properties. He did not suppose that the shareholders could to-day come to any definite decision, but certainly before they did come to any decision they should have every particular laid before them regarding the properties. He also asked whether it would not be possible to raise fresh capital by the issue of fresh shares?—The CHAIRMAN: No, you can do nothing of the kind. There is no provision made for it in the Memorandum of Association.

Mr. GREENSILL: Then we are bound to this scheme of winding up and taking over these properties.

The CHAIRMAN: Not at all. You can either adopt this scheme or you can wind up and adopt some other scheme.

The SECRETARY said that for the information of shareholders he might explain once and for all that according to the 5th clause of the Articles of Association of the company the capital of the company was 72,000l., divided into 12,000 shares of 6l. each; there was no power to increase it unless so stipulated in the Memorandum of Association, and the Memorandum contained no such power.

Mr. GREENSILL: It was an oversight.—The CHAIRMAN: No doubt; and it will be altered.

Mr. GREENSILL said Capt. Waters valued Tankerville at 50,000l., and the Chairman was willing to give the shareholders 36,000l. He thought that the offer of the Chairman was hardly liberal enough, because if the original shareholders did not take the 36,000l. of shares up the public would not get a 2l. share for 12l., which was 10s. each. He could not quite understand the Chairman's statement that there would be 8000l. to work with. Surely there would be more than that.

The CHAIRMAN: That would be the balance of the first 10s. It would leave 8000l. to work with, and 18,000l. more to be called up hereafter if and as required. Mr. GREENSILL said he was certainly more in favour of the scheme than when he first came into the room, but he should like to know what amount the Chairman estimated it would take to put the mines in working order, so as to raise 40 or 50 tons per month. There was a very good engine at Pennerley, and a larger one at Bog, but not in such good condition. He thought the proposal would be more acceptable to the shareholders if the Chairman could agree to take a little less. He noticed that Capt. Waters valued it at 8000l. as a going concern. He should like to ask Capt. Waters what he meant by a "going concern?"

Capt. WATERS: To set them to work. If you set them to work they are worth that, but if you sell them they are not worth quite so much.

Mr. GREENSILL: But they are not "going concerns?"—The CHAIRMAN: Oh, yes; at Pennerley light the fire and you can go to work at once, and get ore.

Capt. WATERS: And the engine in the Pennerley would drain the water in the Bog down to the 70. (Hear, hear.)

Mr. GREENSILL: I should be rather disposed, under the circumstances, to support the scheme, and hoped the Chairman would be a little more liberal in the price he required.

Mr. BEDDLESTONE asked for an explanation of the item of 100l. for income tax. He could not understand it, seeing the mine had paid no dividends.—The SECRETARY said that under the Act of Parliament mines were assessed on the average of profit of five years. The directors had endeavoured to get the company exempted from the payment of that amount, but had not succeeded.

Capt. WATERS said he had himself argued the matter before the Income Tax Commissioners, and two were in favour of his view of the matter and three against it, and consequently the decision was against the company. Mr. ELLWELL considered they were treating with Mr. Peter Watson purely as the vendor of the mines. For his own part he was strongly under the impression that the properties were valuable ones, but he agreed that before any final decision was come to the shareholders should hear the independent reports which the Chairman stated he had in his possession. Judging from the figures which the Chairman had quoted, he thought the valuation of Tankerville had been taken too low. He thought the scheme might well be carried out.

Mr. E. D. SHAW (a director) said that as to what the properties cost Mr. Watson he (Mr. Shaw) nor the rest of the directors knew nothing about it, and that certainly was a matter which they could scarcely expect Mr. Watson to state. He (Mr. Shaw) had been strongly in favour of preference shares, but found that under the constitution of the company they could not be issued, and, therefore, it was perfectly useless for the meeting to discuss that matter any further. Ever since he and his co-director, Mr. Cooper, were elected three years ago, the company had been suffering from want of capital. In addition, they had had the low price of lead to contend against. As regarded this scheme, he should have preferred to keep Tankerville to itself if they could have raised the money, but he could not see how this could be done. They wanted 8000l. or 10,000l., and they must have it from some source or other—either through this scheme or some other. The Roman Gravels had been raised from nothing to its present state of prosperity. That was sold for 47,500l.; this was offered for about one-fifth of that sum. Although he should like to know what profit the Chairman was to make, that was really an unimportant part of the matter, because if the mines under the new plan were a success it would force an immediate part of the amount which was paid. It was usual in these cases to put confidence in the directors. (Hear, hear.) Since he had been a director it had been a post of great discomfort to himself, and he could only say that he had endeavoured to do the best he could. (Hear, hear.) But there was no doubt that they must have fresh capital in Tankerville, or shut up the mine. He wanted to make a profit out of his investment in Tankerville. He had 100 shares more than when he became a director, and this was about the best proof he could give of his confidence in the mine. (Hear, hear.) But supposing they did have a change, could they produce a more practical man than the present Chairman, who had been born and bred a mining man? (Hear, hear.) Could they find a better or more practical secretary than Mr. Murchison, who had had large experience in everything connected with mining? Then, again, there was Capt. Waters. No doubt his opinion of Tankerville had been somewhat rosy, and had not been quite fulfilled, but surely it was better to have a man who looked on the bright side rather than on the dark. (Hear, hear.) Capt. Waters had been born and bred in the neighbourhood, and knew everything connected with these mines, and if they made a change could they get a better man? (No, no.) He had personally attacked Capt. Waters on the subject of getting more lead, till sometimes Capt. Waters seemed almost inclined to turn rusty, and say—"Good morning." (A laugh.) If he could see any chance of doing better than under this scheme he would accept an alternative scheme, but he could not see that any better scheme could be proposed. As regarded the opinion of other experts, no doubt the Chairman would read some of them to the shareholders. For his own part he had every confidence in Capt. Waters, but at the same time that was no reason why the shareholders should act on the *ipse dixit* of that gentleman. As a director he would not try to force this scheme upon the shareholders by the use of proxies which had been resorted to by a large number of shareholder, but he wished it to be decided by the collective opinion of the shareholders present, and if they were not willing, then some other plan must be tried, but what other plan had any shareholder to propose?

Mr. WM. COOPER (a director) said he had been wedded to Tankerville, and he did not give his adhesion to this plan till he saw there was no other plan which could be proposed. His argument was simply this: Could any shareholder propose a better plan, or a more feasible,

practical, and business-like plan! (Cheers.) Could any shareholder show the meeting how they could get 8000l. to go on with Tankerville? He might say Mr. Watson was not the first to introduce this plan to the board. They had not 6d. to go on with, and it was plain something must be done promptly, and one of the other directors—he believed Mr. Greame—said he understood that Mr. Watson had purchased Bog and Pennerley, remarking at the same time that he believed they were excellent properties, and could advantageously be worked with Tankerville. The matter was discussed with Mr. Watson, who expressed himself not unwilling to part with Bog and Pennerley, but the figure he then proposed was considerably higher than that proposed in the present plan. He had asked Mr. Greame, Mr. York, Mr. Murchison, and Captain Waters whether they would receive a single penny if this transaction were carried out, and they had all assured him that they were not interested to the extent of a single penny. (Hear, hear.) The simple question was whether they would lose Tankerville altogether or have something? They could not go on any longer as they were, and, therefore, looking at all the circumstances he had come to the conclusion that the wise course would be to accept the present proposal. (Cheers.)

Mr. W. GREAME (director) said he was the first to introduce this plan to the board. The directors had advanced money at their own risk, and he had seen Mr. Watson, and talked with him, and asked him to find some scheme to get the company out of its difficulty. Mr. Watson then said he had bought Bog and Pennerley, and thought of making a new company, and working them, which Capt. Waters then thought would be the best plan for his (Mr. Watson's) individual interests.

Capt. WATERS: And I think so still.

Mr. GREAME said that when he came to look into it he saw the advantage of working these three companies unitedly, and, therefore, he recommended the shareholders to adopt this plan. (Hear, hear.)

Mr. WM. COOPER: It is right to mention that Mr. Watson offered those two mines at a valuation, but I and Mr. Shaw objected to it. It was not until after we pressed Mr. Watson that he succeeded in bringing about this arrangement.

Mr. BEDDLESTONE made some further remarks as to the amalgamation plan, and after a few further remarks from Mr. CREMONINI.

The CHAIRMAN replied to the questions and observations. Referring to Mr. Cremonini leaving the board, he said he thought that gentleman left not so much because he disapproved of the policy of the directors, but because of a little personal matter with one of them. (Hear, hear.) As he had said, he had several independent reports regarding these properties, and the directors themselves did not know what he was now going to tell the shareholders. The writer of one of those reports stated:—"Isay, taking the buildings and all other matters, the plant is worth, as it stands, from 25,000l. to 30,000l." (Cheers.)

He held in his hand letters written by a gentleman in 1877 (when he first commenced negotiations for the Pennerley Mine) in which the writer said:—"The assets consist of machinery, which is worth 3000l. at a forced sale." The writer of another independent report stated that the powerful machinery was not purchased, carried to the two mines, and erected for less than 20,000l.; and in the conclusion of his letter the writer stated:—"I consider the plant cheap to the company intending to work the property at 12,000l. or 15,000l." They will not only get money's worth, but time is also a consideration.

On taking this into consideration the sum now in the hands of the company, I believe the day is not far distant when, if the property is well and properly developed, you will have one of the largest and best paying mines in the district. (Cheers.) He also held in his hand a report from Mr. J. Taylor, of the eminent firm of Messrs. John Taylor and Sons, in which Mr. Taylor stated:—"At the request of my son, Frank Taylor, and Mr. Harrison, I have, on the part of the firm, examined their valuation of machinery, and consider 9400l. would be a fair valuation to anyone wishing to work the two mines conjointly." He had also a report from the late manager of the Bog and Pennerley Mines, in which he stated:—"With respect to the amalgamation scheme for annexing these two mines with Tankerville, the object should be hailed with unbounded satisfaction. In my opinion there is not in the Principality a mining undertaking equal to it, or possessing such favourable advantages, both with respect to the machinery and pitwork—or, what is of more vital consequence, the rich course of lead and blende at once ready, and available immediately the mines are well drained of water. No doubt, under proper management, the rich run of ground will be practically a source of regular dividends for years to come." (Hear, hear.) Well, both these properties the shareholders would secure for the sum of 7000l., and he could only say that if he were offered 8000l. for the machinery alone at the present time to be taken away, he would not accept it; and had he not pledged himself to his co-directors he very much doubted whether he should have taken 7000l. for the properties.

Mr. GREENSILL: What name will you christen the new undertaking?—The CHAIRMAN said the new name had not yet been decided on.

A SHAREHOLDER said he hoped the name of Tankerville would be retained in some form or other.—The CHAIRMAN said the suggestion would be borne in mind. He could only, in conclusion, express his firm belief that if this scheme were carried out, and they all put their shoulders to the wheel, they would have one of the biggest and best mining undertakings in the kingdom. (Hear, hear.)

The resolution was then put to the meeting, and carried unanimously.

The CHAIRMAN said the confirmation meeting would be held in London in about three weeks.

Mr. E. D. SHAW proposed the re-election of Mr. William Greame as a director.

Mr. SAMUEL YORK seconded the resolution. He said that Mr. Greame had been connected with Tankerville from its earliest days, and there was no man knew more about it than Mr. Greame.—The resolution was put and carried.

On the motion of Mr. GREENSILL, seconded by Mr. MELLOR, the auditors—Messrs. Brandt, Stansfield, and Co.—were re-appointed.

Capt. WATERS: In reply to the gentleman in the corner who said the mine had been worked in an old-fashioned way, I would just say that we have recently spent about 1000l. in Roman Gravels, and we have put up the most modern machinery which the Leeds people could make, and we have put down guiding rods and a patent cage, which was examined by an eminent colliery engineer, who said he had never seen a more perfect arrangement. (Cheers.)

On the motion of Mr. GREENSILL, seconded by Mr. CREMONINI, a cordial vote of thanks was passed to the Chairman and directors, and two or three of the shareholders particularly alluded to the great obligations they were under to the Chairman for his great exertions in endeavouring to make the company a success, and consenting to unite the two properties already named to the Tankerville Company.

The CHAIRMAN acknowledged the compliment, and the meeting broke up.

At the luncheon which succeeded several toasts were given and responded to. The Chairman remarked incidentally that he believed the settlement of the Affghan difficulty would have a beneficial effect upon trade generally, an opinion in which he was supported by Major Gorman, who served in the Affghan campaign of 1838. The health of the Chairman was very warmly received.

WHEAL UNY MINING COMPANY.

A general meeting of shareholders was held at the mine on Monday, Mr. R. BOYNS in the chair.

The usual preliminaries were disposed of, and the accounts submitted, showing a loss on the 16 weeks' working of 2067l. 9s. 11d., and a debit balance of 2832l.

Capt. RICH and ROGERS in their report said that they regretted that the sales of tin have fallen off since the last general meeting, but this is in a measure owing to the men having been employed in opening out ground in the 160 east, besides strong feelings having been expressed that more cross-cuts should be driven, and although they were not over sanguine as to the success of these speculations, yet they have proved these points. The 12 men that have hitherto been employed in making the incline-shaft from the 160 to the 172 will now push on the level west under the tin ground spoken of, and in sinking the engine-shaft deeper. Taking these things into consideration, and the ground laid open eastward, there is reasonable ground to expect that the sales of tin will increase. The mine is in good working order underground, and at surface they have built new burning-house, stack, and flues, and have done and are doing extensive repairs to the boilers and engines. They take this opportunity to state that the whole of the cost is charged in the regular order, and there is no tin credited other than has been actually sold.

Capt. RICH said that he did not know that he could add anything to the report, but there was one thing to which he would like to call attention. There had been unpleasant rumours circulated about the county relating to himself and the working of the mine, and he only regretted that they did not reserve their expressions until the day of the meeting. The books of the mine were open to the inspection of the adventurers, and the mine had been examined by inspectors, and if either of them could point out to him where he was wrong he would endeavour to set it right. Certain charges had been brought against him, and he asked that they might be discussed in a general manner. If he was not capable of steering the ship they should dispense with his services. (Hear, hear.) If they were mistrustful or suspicious of anything he had said or done, he was there prepared to answer any questions they might put to him in regard to the mine. He courted open and the freest discussion of his actions at that meeting. His honour and integrity had been impugned, and he wished to hear what they had to say against him, as he was prepared to meet any charges they might bring forward.

Mr. PERMEWAN complained that the mine had not been more deepened than it had since he had had control. He did not think it was fair to the lords or the shareholders.

Capt. RICH explained that the engine was breaking week after week. He was sent for there, and there was so much water that they had experienced considerable difficulty. Perseverance set (East Uny) was thrown upon them, and they went down to 32l. a ton, and the adventures had as much as they could carry without laying out a lot of money in extra machinery.—Mr. PERMEWAN referred to there being three drawing lifts, and that the cross-cut at the 160 which was commenced eight months ago, had only been cut through about a week since.

Capt. RICH stated that it was only commenced four months ago, and not last January. Nine men were employed in sinking and six men in raising, and they could not possibly do more. He put in pipes to ventilate the mine, and in fact did everything that man could do.

Mr. PERMEWAN was of opinion that there has not been that energy in working the concern that there ought to have been.—Capt. RICH: Then we must have better men and better machinery. We have done all that we can do.—Mr. PERMEWAN: Is it not a fact that the lode at the 150 and 160 is absolutely worthless?—Capt. RICH: Yes. In the south part the lode is split between the 140 and 150.—Mr. PERMEWAN: I have been told that the eastern end over the driven a very long distance east, and that nearly all the stuff has gone out of the burrow, and all your lodes down to the 130 were taken away from them. It is a pity in some places. It is a most astonishing thing to see if that was good from the 90 to the 130 that you did not try for it north.—Capt. RICH: We have tried. The 160 is very poor in the south part.—Mr. PERMEWAN remarked that tin lodes were things that did not die out.—Capt. RICH: Sometimes they do.—Mr. PERMEWAN thought the deeper they went the better they were.

THE IRON AND STEEL INSTITUTE.

The autumn meeting of the present year having been fixed for Dusseldorf, at the invitation of a committee of Westphalian ironmasters, the proceedings commenced in the Tonhalle, on Aug. 25, under the chairmanship of Mr. EDWARD WILLIAMS, the President, supported by the Governor (von Hagemeister), and Burgomaster (Feistel) of Dusseldorf, and a full attendance of the Council of the Institute. Mr. Thielen acted as chairman of the local reception committee, and amongst those present were—Professors Turner (Austria), Akerman (Stockholm), Ponthiere (Louvain), Trasenster (Liège), and Messrs. Jordan (Paris), Forsyth (Chicago, U.S.), Pourcel (Terre-Neire), Fritz (Pittsburg, U.S.), Bollinger (Milan), Kupelweiser (Austria), I. L. Bell, Dr. Siemens, Messrs. Kitson (Leeds), Adamson, C. Bagnall, Evans, Jenkins, Martin, Samuelson, M.P., Josiah Smith, Richardson, Windsor Richards, Fisher Smith, W. T. Lewis, Sir John G. Alleyne, Bart., Messrs. T. Hugh Bell and C. Lowthian Bell, Creusot; M. Barouin, St. Etienne; T. Crampton; W. Crossley; E. A. Cowper; Alf. Davis; F. Gautier, Paris; Alan Gilmour; A. Grüner, Seraing; P. C. Gilchrist; S. Jordan, Paris; J. Kitson; J. Whitley; J. D. Lazen; W. H. Massey; T. Massicks; Harry Mellon; G. H. Parke; J. Waddington; A. Pourcel, Terrenoire; J. Robinson; E. Riley; Sir Joseph Ramsden; Messrs. J. T. Smith; Hy. Simon, Manchester; G. J. Snelus, Workington; W. Thomas; S. G. Thomas; Louis Trasenster; G. A. Habets, Liège; Dr. G. Tosh, Drigg; C. Wood, Middlesbrough; R. Williams, Ebbw Vale; and Wm. Whitwell, Stockton. The hall was decorated with German and British flags alternately displayed.

Messrs. von Hagemeister and Feistel having briefly welcomed the Institute the President thanked the authorities of Dusseldorf and the iron and steel making districts of Westphalia and Rhenish Prussia for the cordial welcome that the members had received, and remarked that in the old days when British iron and steel makers were isolated they were narrow in their views; there was much distrust and suspicion towards our foreign neighbours, and he was inclined to think that our foreign neighbours were not much more trustful or tolerant towards ourselves; but the day for that kind of thing was fast passing away, and the fact that they were gathered together in such large numbers and so many nationalities for a common peaceable object was a conclusive proof they were rubbing out the old obstructions which were so hurtful in time gone by. They were now at liberty to pursue their great avocations in peace—the thinkers to work out the theories, and the workers to comprehend those theories and to work them out to a result. They would soon see the very important works in this district, and estimate them better than they did now, though they were by no means unappreciative of the enormous extension and advance that had been made in Germany during the last few years. In the papers that were to come before them, and in the discussions, they would have more clearly and fully than now the details of such progress. He concluded by thanking the Local Committee in the name of the members of the Institute.

Upon the proposition of Mr. Wrightson, seconded by Mr. Thielen, of the Phoenix Works, near Ruhrort, Mr. Josiah T. Smith, of Barrow-in-Furness, was unanimously elected president for the next year.

The President (Mr. Edwd. Williams) in a brief inaugural address referred to the circumstances under which they were met. He said that, excepting the struggle for the substitution of mechanical for manual labour in the production of iron and steel, the matter of most absorbing interest at the present time was the dephosphorisation of pig-iron, so as to render all kinds of ore available for manufacture into the malleable cast-iron which they, in England, persisted in calling steel. He was not aware that in England at the present time any process for the accomplishment of this object was in actual work, although at several works preparations were being made, and were nearly completed, for the trial of the basic process. Still there were no converters, with basic linings, in actual work making steel. At the various works in this district, however, which the members would have an opportunity of visiting they would be able to see for themselves what results were actually being achieved in this direction in Germany. It was important that their efforts in this direction should not be relaxed for a moment till they were completely successful. The possibility had been demonstrated; the only difficulties in the way were mechanical ones, and though these, he admitted, were very great things only needed to be grappled with seriously, and eventually he did not doubt that they would be subdued. In reviewing the history of iron and steel industries there was much to encourage them in the actual economies that had been effected in the consumption of the raw material—especially fuel—and in the money outlay. To illustrate this he had collected statistics showing the quantity of fuel consumed for the wages paid per ton of iron rails made during a long period of years under his own direction, at works that were, he thought, among the best for economical working. With these results he was able to compare the quantity of fuel used, and the wages expenditure per ton of steel rails made during a tolerably long period ending recently. In both cases the starting point is after delivery of the pig-iron from the blast-furnaces. He found that calling the coal used for iron rails 100, the consumption for steel rails was below 35, and that the wages cost for iron rails being 100 such cost for steel rails was rather less than 28, showing an economy of fuel equal to 65 per cent., and of wages cost equal to 72. The best obtainable statistics of production are so fragmentary and imperfect that no reliable statement of quantities made can be presented; but it probably is within the mark to assume that the present production of rails in Europe and America is not less than 2½ millions of tons per annum. Upon this quantity the coal saved is about 3½ million tons, and rather more than 3,000,000, is saved in the cost of labour alone, after allowing for some items that attach to steel only. Rails constitute but a fraction, through an important fraction, of manufactured iron, and as we may not unreasonably expect that all sorts and kinds of malleable iron will be eventually produced by modern methods that include the Bessemer converter and the open hearth furnace, the money economy, and the saving of their stores of fuel, will be of the highest importance. It adds to the pleasure with which they contemplated that which has been achieved to know that the changes have not added to the sum of human labour, but very materially reduced and ameliorated it. The uses to which cheap and good iron and steel can be applied are almost without number, and in Germany especially great progress is being made in their application, notably to take the place of wood for railway sleepers. Something had been done in England in the same direction, but as yet the difference of cost is said to be against the change. For shipbuilding cast malleable iron or steel must come into general use, though at present the adoption of it is not very extensive, and owing to causes that are, he thinks, in a great degree removable, the rate of advance is slow. In the direction of efficiency, of safety, and all things considered, of economy also, our great industry seems to be steadily advancing, and its progress is aided very materially by friendly intercourse and frank open communication such as they were by the kindness of their German friends here to partake of. The first meeting of the Institute out of England was at Liège, in 1873, and they will not forget that they received from the highly accomplished king of that friendly country a reception such as perhaps was never before given by a reigning sovereign to a purely technical society. In France during the time of the Great Exhibition they had a most cordial welcome from the French ironmasters, and he did not doubt that their present meeting would bring to them as much pleasure and instruction.

ON THE HARDENING OF STEEL AND IRON.

Prof. Akerman, of Stockholm, in a long paper on this subject, maintains that in addition to the two conditions in which carbon is well known to be held in combination with steel and iron there is a third condition. He ascertained by experiment that a piece of steel heated to a red heat and placed on an anvil covered with powdered charcoal, and hammered until it was cool, absorbed a portion of the carbon; but that a similar piece of steel, heated in the same way and allowed to cool in contact with the charcoal, but without being hammered, showed no trace of having absorbed any of the carbon. In this way he found that carbon could be taken up by steel under pressure. The paper, which contains an elaborate series of tabulated experimental results, is devoted to the elaboration of this theory.

In the discussion which followed the reading of this paper Dr.

Siemens said it was the first serious attempt that had been made to explain those phenomena in connection with the hardening of steel, which had stood in their way so long. In his discovery that carbon exists in iron and steel in three conditions, and not two as they were apt to believe, Prof. Akerman gave them the key to those changes which take place in the making of steel. Referring to a statement in the paper in regard to the testing of steel, he said that he agreed with Prof. Akerman that they should exclude from the test for elongation the diminished part of the bar, and take that part only that was really elongated; but he would go farther than that, and he would suggest that it was quite sufficient to carry the test to the point when partial elongation commences, as from that moment the test was no longer a proper test of the strength of the material. It would certainly be far more correct to reckon the elongation exclusive of that portion that had been wire-drawn. He agreed with Prof. Akerman that the vexed question of nomenclature would have to be dealt with yet. Prof. Akerman had shown that all material containing traces of carbon was capable of being hardened, and suggested that only those materials which, when subjected to a hardening process, would resist the scratching of a piece of felspar should be included under the denomination of steel. But he (Dr. Siemens) saw difficulties in the way, as they might have iron containing phosphorus, and therefore hard, which had no claim to be considered as steel.

After a few remarks from Messrs. Adamson and Spencer, Mr. G. J. Snelus, referring to Prof. Akerman's theory that the presence of carbon in a third condition probably accounted for the difference between hardened and unhardened steel, said that it was important in such matters to study the conditions of occluded gases. He believed that large volumes of carbonic oxide were occluded in steel, beyond what might exist in it as permanent gas, and he could not help thinking that in all probability the hardening of steel might have something to do with the liberation of this occluded gas. At least it was a point worth following up.—Mr. Riley said the paper touched upon a point of great importance, and he thought that they must look to the occlusion of gases to account for many phenomena not yet understood. One thing was certain, they must go further in chemical analysis than they had yet done.

[To be continued in next week's Journal.]

Registration of New Companies.

The following joint stock companies have been duly registered:—

THE TYLLWYD AND DYNEVOR COLLIERY COMPANY (Limited).—Capital 3000*l.*, in shares of 20*l.* To acquire the Tyllwyd Colliery and Dynevor Mineral property, together with the works, plant, machinery, effects, &c., and any other coal, ironstone, and other mineral properties, to sell or otherwise dispose of all or any of them, and generally to carry on the business of colliery proprietors and mineowners in all its branches. The subscribers are—F. Crowson, Darlington, colliery proprietor, 25; L. Benton, Wednesbury, colliery proprietor, 25; J. H. Ketley, Yardley, mineral merchant, 12; A. Glenday, Cardiff, mineral merchant, 12; J. Oakley, Willenhall, mining engineer, 25; S. Hern, Cardiff, estate agent, 1; G. H. Noel, Cardiff, merchant, 1. The first directors are Messrs. Crowson, Benton, Ketley, and Glenday, and the secretary Mr. S. Hern.

THE KIMBERLEY MINING COMPANY (Limited).—Capital 200,000*l.*, in shares of 20*l.* and 10*l.* To adopt and carry out certain agreements for the acquisition and working of mining claims in diamond mines, situate in South Africa, and the acquisition by purchase of all houses, machinery, plant, chattels, and effects to be used in connection with such mines, for the purpose of carrying on the business of miners, prospectors, buyers, and sellers of diamonds, and other precious stones or metals, and that of diamond merchants, brokers, and cutters, and any other operations connected with the company's properties. The subscribers (who take one share each) are—R. T. Latley, 16, Devonshire-square, solicitor; T. Lewis, 104, Hatton Garden, diamond merchant; S. W. Paddon, 104, Hatton Garden, diamond merchant; W. R. Bevell, Grafton Club, no occupation; W. Martin, 11, Hatton Garden, merchant; J. Wilson, 10, Hatton Garden, diamond merchant; G. M. Hewett, Canonbury, clerk, Messrs. Latley, Lewis, Paddon, L. Marks, and F. S. P. Stow are to be the first directors, the number of whom must not exceed seven or be less than three. Qualification, 50 shares.

THE BISCAY STEAMSHIP COMPANY (Limited).—Capital 20,000*l.*, in shares of 10*l.* Carrying on the general business of a merchant and steamship owner. The subscribers are—A. E. Lloyd, Worsley, 550; J. Higgins, Woodhey, 100; G. Kinloch, Manchester, 200; J. Wood, Manchester, 100; W. Curwen, Birkenhead, 200; J. B. Lloyd, Manchester, 50; D. O'Keefe, Liverpool, 25.

CENTRAL NEWS (Limited).—Capital 20,000*l.*, in shares of 20*l.* To carry on the business of the Central News, and that of a news agency, newspaper proprietors, and publishers. The subscribers (who take one share each) are—E. Saunders, 107, Fleet-street; W. Hunt, Hull; S. Saunders, Wilts; P. Duff, 107, Fleet-street; J. Moore, Peckham; A. Kinnear, 186, Kennington-road; B. Burleigh, Herne Hill.

THE SPANISH AGRICULTURAL AND DISTILLERY COMPANY (Limited).—Capital 100,000*l.*, in shares of 10*l.* To carry on an agricultural and distillery business in connection with Spain. The subscribers (who take one share each) are—G. C. Clark, Market Buildings; N. J. Senior, 98, Cheyne Walk; T. Haffenden, Mortlake; G. W. Marshall, 42, St. Luke's-road; J. E. Denney, Brentwood; H. J. Leslie, Old Jewry; H. Philbrick, 18, Austin Friars.

THE DEVON AND CORNWALL DAIRY FARM COMPANY (Limited).—Capital 5000*l.*, in shares of 10*l.* To acquire a business situate in Goodge-street, and carry on the same. The subscribers (who take five shares each) are—F. Waymouth, Layton; E. Adair, 1, Hanway-street; F. Baker, 6, York-place; R. S. Stacy, 257, Euston-road; T. H. D. Allen, 26, Camden-road; G. H. King, 165, Great Portland-street; H. Gibbard, Hereford.

THE BOYNE MILL MANUFACTURING COMPANY (Limited).—Capital 70,000*l.*, in shares of 10*l.* To carry on the business of manufacturers, dyers, weavers, spinners, printers, and bleachers at the Boyne Mill, Drogheda. The subscribers (who take one share each) are—B. Whitworth, 11, Holland Park; A. Whitworth, Manchester; R. Whitworth, Manchester; W. W. Whitworth, Drogheda; T. Whitworth, Manchester; J. Whitworth, Bowdon; N. Whitworth, Drogheda; A. Hardie, Broughton.

ELLERBECK COLLIERIES (Limited).—Capital 70,000*l.*, in shares of 10*l.* To carry into effect certain agreements made between W. E. M. Tomlinson, T. Tomlinson, and W. Tomlinson of the one part and T. Beverley for the company, and which agreements relate to the purchase of a mining property situate at Cappull, Lancashire, and to acquire by purchase or otherwise any other mines, beds, seams, and quarries of coal, cannel, ironstone, limestone, fireclay, and other minerals and earths. The working and carrying on the collieries, mines, minerals and other properties, works, and concerns belonging to the company, the farming of land and all things incidental thereto. The subscribers (who take one share each) are—W. E. M. Tomlinson, 3, Richmond-terrace, barrister; W. Tomlinson, 3, Richmond-terrace, M.A.; E. M. Tomlinson, 4, Tavistock-square, clerk in holy orders; T. Tomlinson, 3, Richmond-terrace, barrister; F. P. Tomlinson, 29, Longridge-road; R. Vevers, Fulwood, land agent; J. C. Eccles, Preston, gentleman. The number of directors must not be less than five nor more than seven; any registered member shall be qualified to be a director. The first directors are Messrs. W. E. M. Tomlinson, T. Tomlinson, F. P. Tomlinson, and R. Vevers.

THE GOWER BELL TELEPHONE COMPANY (Limited).—Capital 200,000*l.*, in shares of 10*l.* To carry on the manufacture and sale of telephones, telegraphic instruments, and lines and apparatus connected therewith. The subscribers are—F. A. Gower, 9, Great Winchester-street, 20; A. Scott, 223, Gresham House, 1; C. J. Wollaston, 223, Gresham House, 1; A. F. St. George, Red Hill, 1; G. Clements, 17, Gresham House, 1; W. T. Edmonds, Sutton, 1; J. M. Williams, 17, Gresham House, 1.

THE PERMANENT INVESTMENT AND BUILDING ASSOCIATION (Limited).—Capital 50,000*l.*, in shares of 5*l.* To carry on the ordinary business of an investment and building society. The subscribers

(who take one share each) are—W. B. Harvey, 8, Old Jewry; W. W. Bird, 15, York Buildings; E. Aldebert, 10, Harwood-road; T. Godrich, Fulham; W. M. Till, Bradford; H. J. Jonas, Fulham; W. H. Rawkins, 64, Barclay-road.

REALM FIRE INSURANCE COMPANY (Limited).—Capital 25,000*l.*, in shares of 2*l.* To carry on the business of fire insurance in all branches both at home and abroad. The subscribers (who take one share each) are—W. E. Bishop, Penge; J. H. Bryant, 3, Abbey-terrace; S. Baker, 28, Alma-square; T. Edmonds, 51, Beckway-street; J. E. Powell, Brixton; S. M. Tillotson, Kilburn; A. Crawley, 27, Farringdon-street.

NEW DAIRY REFORM AND PROVISION COMPANY (Limited).—Capital 20,000*l.*, in shares of 5*l.* To carry on the business of dairymen and dealers in dairy produce, and also in provisions. The subscribers (who take one share each) are—R. H. Browne, Reigate; R. C. C. Graham, 29, Orchard-street; J. Wilson, 29, Orchard-street; F. J. Monro, 11, Queen Victoria-street; C. T. Lane, 11, Queen Victoria-street; E. C. Hely, 6, Upper Woburn-place; H. W. Soutter, New Barnet.

SHEFFIELD AND ROTHERHAM JOINT STOCK BANKING COMPANY is incorporated as a Limited Liability company under the Companies' Acts of 1862 and 1880.

FOREIGN MINING AND METALLURGY.

There is little news to communicate with respect to the Belgian iron trade. No very important contracts have been concluded, and prices have shown but little variation. General changes are being made by Belgian mechanical construction companies. Dyle has become Dyle-Bacalan, Bruine has become Bruine-Savigniano, and the Eward Company is concentrating its forces on La Croÿère.

In the Haute-Marne transactions in iron have not presented any very great interest. A tolerably good number of propositions are forthcoming, but prices form the subject of a good deal of discussion and many of the offers made are perforce rejected. The lowest price accepted for coke-made iron has been 7*l.* 12*s.* per ton, and for mixed iron 8*l.* 8*s.* per ton. First-class sheets have made 8*l.* 4*s.* to 8*l.* 8*s.* per ton. For the rest, prices may be said to have remained generally without variation. No improvement can be reported in the iron trade in the Nord. In the Meurthe-et-Moselle pig for refining ranges between 6*l.* 12*s.* and 6*l.* 16*s.* per ton; iron is quoted at 7*l.* 4*s.* to 7*l.* 12*s.* per ton. The total production of coal and lignites in France in the first half of this year is returned at 9,398,315 tons, as compared with 8,773,347 tons in the second half of 1879. The production of pig of all kinds in France for the first half of 1880 was 847,335 tons, against 687,187 tons in the second half of 1879; of steel, 183,173 tons, against 169,968 tons; and of iron, 487,320 tons, against 446,435 tons.

The condition of the Belgian coal trade remains favourable. The sugar and glass works are sending a good current supply of orders, so that colliery proprietors can afford to wait quietly for the winter. It is remarked, at the same time, that the state of the trade is better at Liège and Charleroi than in the Conchate de Mons. The stocks which exist in this latter basin are not absorbed so quickly as could be desired. On the other hand, long-term contracts are being rather eagerly concluded by purchasers. In Germany there appears to be a general anticipation of an advance in coal, but it is scarcely realised at present. Transactions are carried through readily and easily, but colliery proprietors hesitate to enter into contracts for long periods. The production of coal in the basin of the Ruhr, which was 11,443,944 tons in 1868, rose in 1879 to 20,380,420 tons. An association of producers has been formed to secure a reduction of 5 per cent. in the production this year; this association has just been extended to 1881. The production of the German State collieries in the basin of the Sarre is also increasing; it was 4,494,839 tons last year. The demand was active last year, and advantageous prices were obtained.

Navigation has now been resumed upon most of the French canals, and deliveries of coal have been conducted without interruption. The experience of last year has not been lost on French coal dealers, who are laying in large supplies in order to meet readily the possible requirements of their clients. In the Nord and the Pas-de-Calais the coal trade presents a favourable aspect, the autumn and winter season having opened well. At the same time, the transport question occasions a certain amount of uneasiness among those connected with the trade. The question which presses for consideration is how would consumers and producers fare in presence of a rigorous winter like that of last year? It is satisfactory, however, to know that the Northern of France Railway Company is increasing its rolling with the view of dealing effectively with the requirements of the districts which it accommodates. The production of coal in the Pas-de-Calais last year amounted to 4,175,573 tons, as compared with 3,829,851 tons in 1878, 3,435,641 tons in 1877, 3,336,919 tons in 1876, and 3,257,509 tons in 1875. It will be seen that the production has increased very steadily during the last four or five years. The production of the Pas-de-Calais exceeded that of the Nord in 1879 by 1,000,000 tons.

WEST PHOENIX.—The starting of the engine in West Phoenix has been hailed with great satisfaction by all parties in the district; and now that the sinking has been resumed this mine will be anxiously watched by all speculative men. The property is undoubtedly one of great promise, and is the most important piece of mining ground that has been started in the Caradon district for several years past. The set adjoins the celebrated Phoenix United Mines, and the present operations are on the same masterly lode which runs through the set for 900 fms. in length, and it is the opinion of practical mine agents, such as Capt. Holman, of South Caradon, Capt. Truscott, of Phoenix, and others, that it will in all probability prove equally productive. The mine is owned principally by men of capital who hold their interest as a good investment (not merely as a speculation), having every confidence that the lode in its development will prove equally as valuable as in the Phoenix United Mines; and, indeed, there is no reason to expect otherwise seeing that the continuation of the lode, stretching away from Phoenix through West Phoenix, shows similar ancient workings on its back, and from the fact of the lode being worth 30*l.* per fathom at the 30 in the shaft which was sunk by Mr. Henry Vatcher many years ago on the boundary of the two sets, augurs well for its success, and there is every probability of the adventurers being handsomely rewarded for their outlay.

ELECTIONS RECORD.—Mr. T. J. Buse, of Great Winchester-street, and Swans, whose name is already known to the readers of the *Mining Journal*, has just issued a record of the elections showing in tabular form the number of members and voters for each constituency, the number of votes recorded for each candidate, whether Liberal or Conservative, and whether elected or rejected. The tables will be very useful for the purposes intended.

CASSELL'S PUBLICATIONS.—"Science for All," part 34, contains the conclusion of the article on "Comets; How Hailstones are Forged in the Clouds," by Dr. Mann; "The Starfish, and its Relatives," by Prof. F. J. Bell; "Saliva," by E. W. von Tuzelmann; "Bending a Bow," by W. Durham; "Weighing the Earth," by Wm. Ackroyd; and on "A Red Seaweed," by Prof. E. P. Wright. The "History of Protestantism," part 15, includes the chapters on the German Anabaptists, or the "Heavenly Kingdom;" the Accession of Princes and States to Protestantism; the Death and Burial of Luther; the Schmalkald War and the Defeat of Protestants, the interim—re-establishment of Protestantism; and the first portion of the thirteenth book treating of the rise of Protestantism in France (1510) to the publication of the Institutes (1526). Knight's "Dictionary of Mechanics," part 45, extends from Matchboard to Mill-hopper alarm.

HOLLOWAY'S PILLS.—This cooling medicine has the happiest effect when the blood is overheated and a tendency to inflammatory action is set up in the system; one pill taken shortly before dinner does away with the indigestion, fulness, and flatulency—indications of a weak stomach or disordered liver. A few pills taken at bed-time act as alteratives and aperients; they not only relieve the bowels, but regulate every organ connected with them, overcome all acid humours, and encourage a free supply of all the secretions essential to our well-being. Holloway's pills thoroughly cleanse and perfectly regulate the circulation, and beget a feeling of comfort in hot climates and high temperatures, which is most desirable for preservation of health.



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Steam-Engines & Boilers, also the Special Steam Pump,
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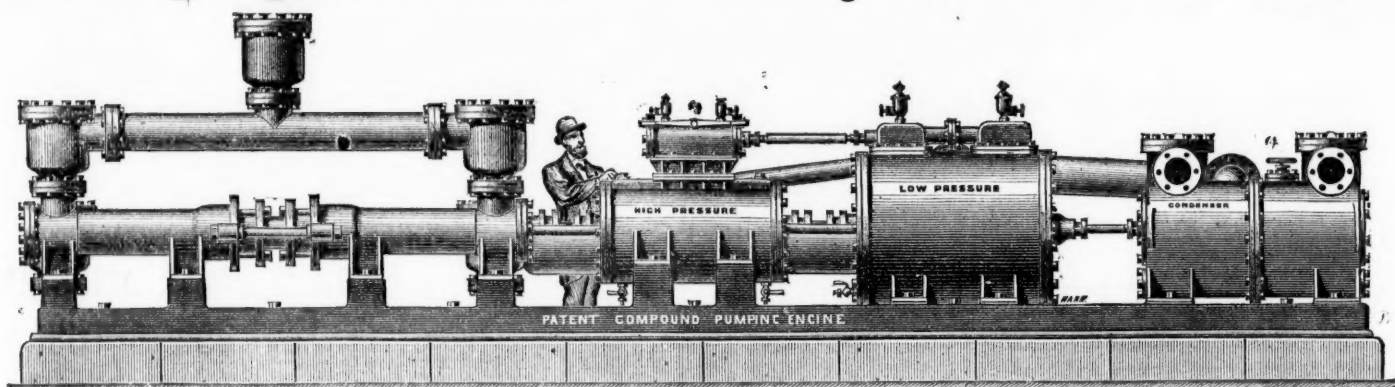


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TANGYE'S DIRECT-ACTING
COMPOUND PUMPING ENGINE,

For use in Mines, Water Works, Sewage Works,
And all purposes where Economy of Fuel is essential.



TANGYE'S DIRECT-ACTING COMPOUND PUMPING ENGINE, WITH AIR-PUMP CONDENSER.

TANGYE'S COMPOUND PUMPING ENGINE COMBINES SIMPLICITY, CERTAINTY OF ACTION, GREAT ECONOMY
IN WORKING, COMPACTNESS, AND MODERATE FIRST COST.

This Engine will be found the most simple and economical appliance for Mine Draining, Town Water Supply, and General Purposes of Pumping ever introduced, and as regards Mine Draining, the first cost is very moderate compared with the method of raising water from great depths by a series of 40 or 50 fm. lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pitwork, are required, while they allow a clear shaft for hauling purposes. In this Engine the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere.

The following first-class Testimonials will bear evidence as to the efficiency and economy of the Engine :—

TESTIMONIALS OF TANGYE'S COMPOUND PUMPING ENGINE.

21' Newcastle and Gateshead Water Company, Newcastle-on-Tyne, Oct. 20, 1879.
36" x 10" x 48" COMPOUND CONDENSING STEAM PUMPING ENGINE.
Messrs. Tangye Brothers.
GENTLEMEN,—In reply to your enquiry as to the efficiency of the two pairs of Compound Condensing Engines recently erected by you for this company at our Gateshead Pumping Station, I have great pleasure in informing you that they have far surpassed my expectations, being capable of pumping 50 per cent. more water than the quantity contracted for; and by a series of experiments I find they work as economically as any other engine of the compound type, and will compare favourably with any other class of pumping engine. By the simplicity of their arrangement and superior workmanship they require very little attendance and repairs, and the pumps are quite noiseless. A short time ago I had them tried upon air by suddenly shutting off the column, and found they did not run away, thus showing the perfect controlling or governing power of the Floyd's Improved Steam-moved Reversing Valve. I will thank you to forward the other two pairs you have in hand for our Benwell Pumping Station.
(Signed) Yours respectfully,
JOHN R. FORSTER, Engineer.

The Chesterfield and Boythorpe Colliery Company (Limited),
Registered Office, Boythorpe, near Chesterfield, Oct. 1, 1879.
36" x 12" x 48" DOUBLE RAM COMPOUND CONDENSING STEAM PUMPING ENGINES.
Messrs. Tangye Brothers. Supplied in January, 1878.
GENTLEMEN,—Referring to the above, which we have now had working continuously night and day for the last 12 months, we are glad to say that it is giving us every satisfaction. It is fixed about 400 feet below the surface, the steam being taken down to it at pressure of 45 lbs. per square inch. We can work the pump without any difficulty at 28 strokes per minute—224 ft. piston speed. The pumping power is enormous. The vacuum in the condenser being from 11½ to 13 lbs. The pump is easily started, and works well and regularly. The amount of steam taken being much less than we anticipated. We consider the economy in working very satisfactory indeed. The desire for power and economy at the present day will certainly bring this pump into great requisition.
Yours truly,
(Signed) M. STRAW, Manager.

SIZES AND PARTICULARS.

	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Diameter of High-pressure Cylinder.....In.	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder	14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	203	203

CONTINUED.

	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Diameter of High-pressure Cylinder	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder	28	28	28	28	32	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder	8	10	12	14	8	10	12	14	10	12	14	10	12	14	12	14
Length of stroke	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,950	35,225	47,950
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562	562
Ditto ditto ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750	750
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937	937

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

NORTHERN DEPOT:—TANGYE BROTHERS, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.

TWO GOLD MEDALS.



SOLE MAKERS—

The LEEDS FORGE CO., Ltd.,
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FOX'S PATENT CORRUGATED FURNACE FLUES,

NOW APPLIED TO OVER

1000 IND. H.P.

PARIS, 1878.

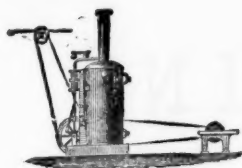


PRICE LISTS AND
PARTICULARS
ON APPLICATION.

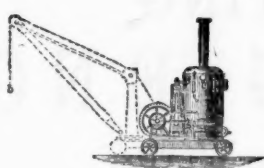
CHAPLIN'S PATENT PORTABLE STEAM ENGINES AND BOILERS.

(PRIZE MEDAL, INTERNATIONAL EXHIBITION.)

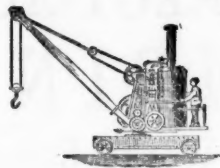
ALWAYS IN STOCK OR IN PROGRESS.



STATIONARY ENGINE.
From 1 to 30 horse-power.
No building required.



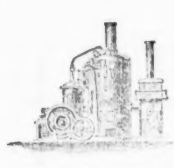
PORTABLE HOIST.
1 to 30 horse-power.
With or without Jib.



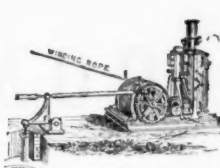
STEAM CRANE.
15 cwt. to 20 tons.
For Wharf or Rail.



CONTRACTORS' LOCOMOTIVE.
9 to 27 horse-power.
For Steep Inclines and Quick Curves.



SHIP'S ENGINE.
For Winding, Cooking, and Distilling.
Sanctioned by H.M. Government.



PUMPING AND
WINDING ENGINE.
6 to 30 horse-power.

* These cranes were selected by H.M. Commissioners to receive and send away the heavy machinery in the International Exhibitions 1862, 1871, and 1872.

Chaplin's Patent Improved Steam Excavator or "Navy."
Steam and Hand Derrick and Overhead Travelling Cranes.

Engines and Boilers for Light Screw and Paddle Steamers.
Steam Cargo Barges, Steam Launches, and Yachts.

PATENTEES AND SOLE MANUFACTURERS:

ALEX. CHAPLIN AND CO., CRANSTONHILL ENGINE WORKS, GLASGOW.

London House: 63, Queen Victoria-street, London, E.C.

ENGINES OF EACH CLASS KEPT IN STOCK, AND ALL OUR MANUFACTURES GUARANTEED AS TO EFFICIENCY, MATERIAL, AND WORKMANSHIP.

Parties are cautioned against using or purchasing imitations or infringements of these Patent Manufactures.

MANCHESTER WIRE WORKS.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

JOHN STANIAR AND CO.,

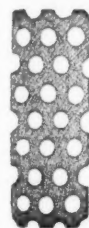
Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES

Shipping Orders Executed with the Greatest Dispatch.



Export
Orders
promptly
attended to

PERFORATORS, WIRE WEAVERS, AND GENERAL
IRONMONGERS,

Established 1848.
Samples and prices
on receipt of
specification.

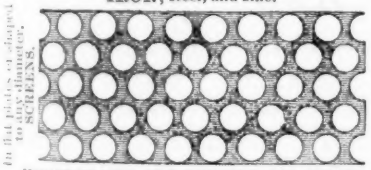
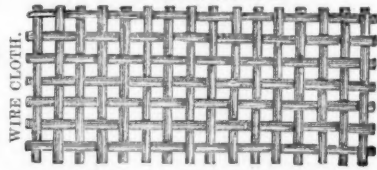
J. AND F. POOL,
COPPERHOUSE, HAYLE, CORNWALL.

Millimeter holes perforated in sheet-copper, brass,
IRON, steel, and zinc.

CERTIFICATE OF MERIT

Awarded by the
Mining Institute of Cornwall
for
SIEVES AND GRATES,
Shown at the Annual Exhibi-
tion, 1879.

Lineal holes per inch woven in copper, brass,
iron, and steel wire.



JIGGER-PLATES AND CYLINDRICAL SIEVES.

Manufacturers of Stamps-Grates, Sieves, and Riddles, for Mining and other purposes, by Self-acting
Steam Machinery.

SPECIALITY.—Thick Copper, Brass, Zinc, and IRON Perforations, Classifying-Sieves,
Pierced Pulveriser and Stamps-Grates up to 289 holes to the square inch, Copper-
bottom "Tinsifts," Spigot and Faucet Zinc Air-pipes, Powder Charges, &c.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM.

SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, 2 ft. 6 in. drums.
A,— 6 in. double cylinder, with 2 ft. 3 in. drums.
B,— 8 in. " " 3 ft. 0 in. drums.
C,— 10 in. " " 3 ft. 6 in. drums.
D,— 12 in. " " 4 ft. 6 in. drums.
E,— 14 in. " " 5 ft. 0 in. drums.

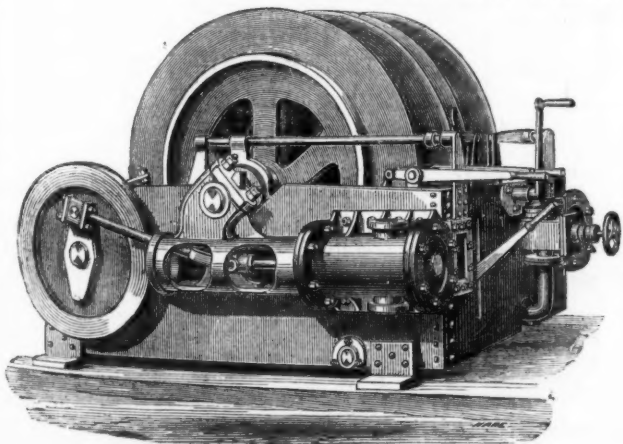
MANUFACTURED BY

THE USKSID CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING
MACHINERY, AND FORGINGS OF EVERY
DESCRIPTION.

NEWPORT, MON.

Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDINGS,
NEWCASTLE-ON-TYNE.
(This Advertisement appears fortnightly.)



SOLID DRAWN BRASS AND COPPER BOILER TUBES,

FOR LOCOMOTIVE OR MARINE BOILERS,
EITHER

MUNTZ'S OR GREEN'S PROCESS.

MUNTZ'S METAL COMPANY (LIMITED),
FRENCH WALLS,
NEAR BIRMINGHAM.

INCREASED VALUE OF WATER-POWER.

MACADAM'S VARIABLE TURBINE.

This Wheel (which is now largely in use in England, Scotland, and Ireland) is
the only one yet invented which gives proportionate power from both large and
small quantities of water. It can be made for using a large winter supply, and
yet work with equal efficiency through all variations of quantity down to a fifth,
or even less if required. It is easily coupled to a steam-engine, and in this way
always assists it by whatever amount of power the water is capable of giving,
and therefore saves so much fuel.
This Turbine is applicable to all heights of fall. It works immersed in the tail-
water, so that no part of the fall is lost, and the motion of the Wheel is not
affected by floods or back-water.
References to places where it is at work will be given on application to—

MACADAM BROTHERS AND CO.,
BELFAST.



By a special method of preparation this leather is made solid, perfectly close in
texture and impermeable to water; it has, therefore, all the qualifications essen-
tial for pump buckets, and is the most durable material of which they can be
made. It may be had of all dealers in leather, and of—

HEPBURN AND GALE,
TANNERS AND CURRIERS,
LEATHER MILL BAND AND HOSE PIPE MANUFACTURERS,
LONG LANE, SOUTHWARK LONDON.
Prize Medals, 1851, 1855, 1873 for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

W. F. STANLEY

MATHEMATICAL INSTRUMENT MANUFACTURER TO H.M.'S
GOVERNMENT, COUNCIL OF INDIA, SCIENCE AND
ART DEPARTMENT, ADMIRALTY, &c.
MATHEMATICAL, DRAWING, and SURVEYING INSTRUMENTS of every
description, of the highest quality and finish, at the most moderate prices.
Price List post free.

ENGINE DIVIDER TO THE TRADE.

ADDRESS—GREAT TURNSTILE, HOLBORN, LONDON, W.C.



HULME & LUNDS SPECIALITIES.
DONKEY PUMPS, MINING PUMPS,
HORIZONTAL PUMPS, TAR PUMPS,
AIR COMPRESSORS,
FIRE ENGINES, STEAM ENGINES,
WILBURN IRON WORKS
SALFORD, MANCHESTER.

THE GRAND PRIZE, THE TRIPLE AWARD.

Gold Medal, Silver Medal, and Honourable Mention awarded at the Paris Exhibition, in competition with all the World, FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

HIGHEST AWARDS
FROM THE
MINING INSTITUTE
OF CORNWALL.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE-MARSDEN

PULVERISERS,
B O N E M I L L S,
MORTAR MILLS,
&c., &c.

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws,
in Sections with Patent
Faced Backs.

NEW PATENT ADJUSTABLE
TOGGLES.

OVER 2750 IN USE.

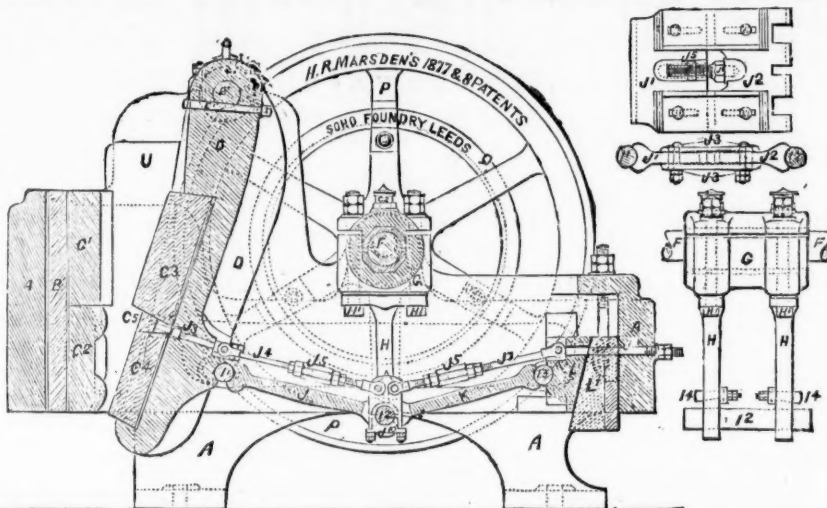
NEW PATENT WROUGHT-IRON CONNECTING
ROD.

New Patent Draw-back
Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

60

PRIZE MEDALS.



8, Queen-street-place, London, E.C.
DEAR SIR,—We have adopted your Stone Breaker at
many of the mines under our management, and are
pleased to be able to state that they have in all cases
given the greatest satisfaction.

We are, yours faithfully,
JOHN TAYLOR AND SONS,
Soho Foundry, Meadow-lane, Leeds.

St. John del Rey Mining Company (Limited).
A SAVING OF FIFTY-FIVE HANDS BY THE USE OF
ONE MEDIUM-SIZED MACHINE.

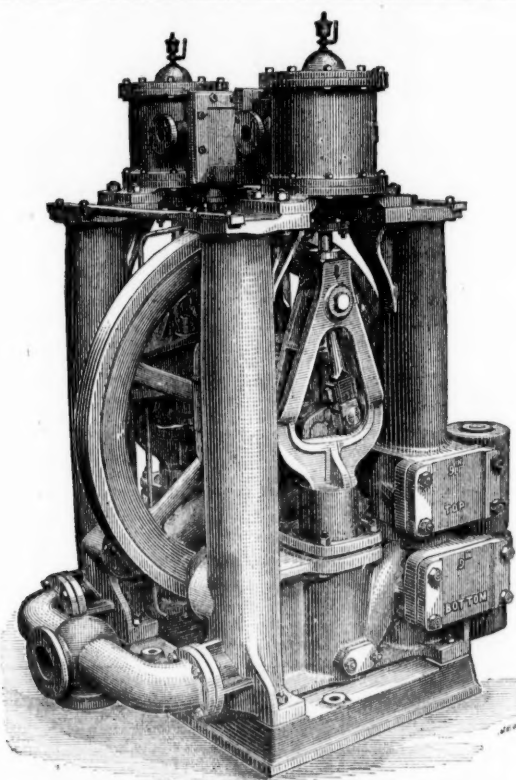
BLAKE'S STONE BREAKER.—Statement made by the Managing Director of the St. John del Rey Mining Company, Mr. John Hockin, with regard to six months' practical working of Blake's Stone Breaker, affording facility for judging of the relative economy of machine and hand labour in this kind of work, and also of the cost of getting the Stone Breaker to work in difficult places. The price paid to Mr. Marsden for the machine referred to by Mr. Hockin was £180, and adding to this the cost of engine, carriage, and fixing, the aggregate cost to the company of the Breaker in working order was £250. By this outlay the company is enabled to dispense with the labour of 55 people, the value of which is £600 per annum. The cost of working the machine could not be more than the wages of about five men (the machine requires but one man to feed it, so that the rest would be for engineer, fuel, oil, &c.), and allowing for interest on outlay and for renewal when necessary, the saving must be enormous.—Mining Journal.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS.



STEAM PUMPS for COLLIERY PURPOSES, specially adapted for Forcing Water any height; also for Sinking; and for Feeding Boilers.

JOHN CAMERON has made over SIX THOUSAND.

WORKS: OLDFIELD ROAD, SALFORD, MANCHESTER.

JOSEPH FIRTH AND SONS' New Patent Brick-making Machine

Embraces the following advantages—viz.: Simplicity, strength, and durability. Compactness and excellence of mechanical arrangements, large producing capabilities, moderate cost.

It makes two bricks at once, and will make 2,000 to 14,000 plastic pressed bricks per day, hard enough to go direct to the kiln without drying; or it will make the bricks thoroughly plastic if required. For works requiring a machine at less cost the machine is made to turn out one brick at once, and is capable of producing 8000 bricks per day.

The Machine can be seen at work daily at the Brickworks of the Patentees, JOSEPH FIRTH AND SONS, WEBSTER HILL, DEWSBURY, as also their Patent Gas Kiln for Burning Bricks, which possesses the following amongst other advantages, viz.:—Economy in Fuel, Rapidity and Quality of Work, even Distribution of Heat, and Total Consumption of Smoke.

[See Illustrated Advertisement every alternate week.]

ASBESTOS.

FURSE BROTHERS & CO., Manufacturers, ROME

Millboard.....guaranteed 95 per cent. Asbestos.

Rope Packing.. „ pure Asbestos.

Fibre Paper, Felt, &c., &c.

The Best and most Economical Steam Packing and Jointing.

SOLE AGENTS: WITTY & WYATT.

Office: 9, Fenchurch Street. Warehouse: 1, Fenchurch Avenue.

MONEY LENT, at EIGHT, NINE, and TEN PER CENT., on FIRST MORTGAGE of FREEHOLDS for IMPROVEMENTS and STOCKING, said freeholds in the Province of MANITOBA. Address, HERBERT C. JONES, Solicitor, 20, Masonic Hall, Toronto.

THE "CHAMPION" ROCK BORER

MINE AND QUARRY STANDS, STEEL DRILLS, SPECIALLY PREPARED INDIARUBBER HOSE, TESTED IRON PIPES, &c.



Air-Compressing Machinery,

Simple, strong, and giving most excellent results, and
ELECTRIC BLASTING APPARATUS.

Full particulars of rapid and economical work effected by this machinery, on application.

R. H. HARRIS, late

ULLATHORNE AND CO., 63, QUEEN VICTORIA STREET, LONDON, E.C.

HIGHEST AWARDS:—



PARIS EXHIBITION, 1878.
YORK EXHIBITION, 1879.

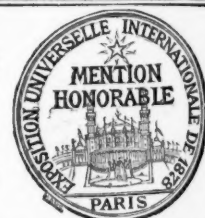
SALMON, BARNES, & CO.,

MANUFACTURERS OF THE PATENT

ROANHEAD ROCK DRILL,

ALSO OF

ATKINSONS PATENT



PARIS EXHIBITION
1878.

FEED WATER HEATER.

FULL PARTICULARS AND PRICES ON APPLICATION.

Canal Head Foundry and Engineering Works, Ulverston,
LANCASHIRE.

GOLD MEDAL AWARDED, PARIS EXHIBITION 1878.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

MINING STEEL of every description.

CAST STEEL FOR TOOLS. CHISEL SHEAR. BLISTER. & SPRING STEEL
MINING TOOLS & FILES of superior quality.

EDGE TOOLS, HAMMERS, PICKS, and all kinds of TOOLS for RAILWAYS, ENGINEERS, CONTRACTORS, and PLATELAYERS.
LOCOMOTIVE ENGINE, RAILWAY CARRIAGE and WAGON SPRINGS and BUFFERS.

SHEAF WORKS & SPRING WORKS, SHEFFIELD.

LONDON OFFICES—90, CANNON STREET, E.C. PARIS DEPOT—12, RUE DES ARCHIVES. BOSTON, MASS., U.S.—40, KILBY STREET.

J. WOOD ASTON AND CO., STOURBRIDGE

(WORKS AND OFFICES ADJOINING CRADLEY STATION),

Manufacturers of

CRANE, INCLINE, AND PIT CHAINS.

Also CHAIN CABLES, ANCHORS, and RIGGING CHAINS, IRON and STEEL SHOVELS, SPADES, FORKS, ANVILS, VICES, SCYTHES, HAY and CHAFF KNIVES, PICKS, HAMMERS, NAILS, RAILWAY and MINING TOOLS, FRYING PANS, BOWLS, LADLES, &c., &c.

Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions

WELDED STEEL CHAINS { FOR CRANES, INCLINES, MINES, &c.,
MADE ALL SIZES.